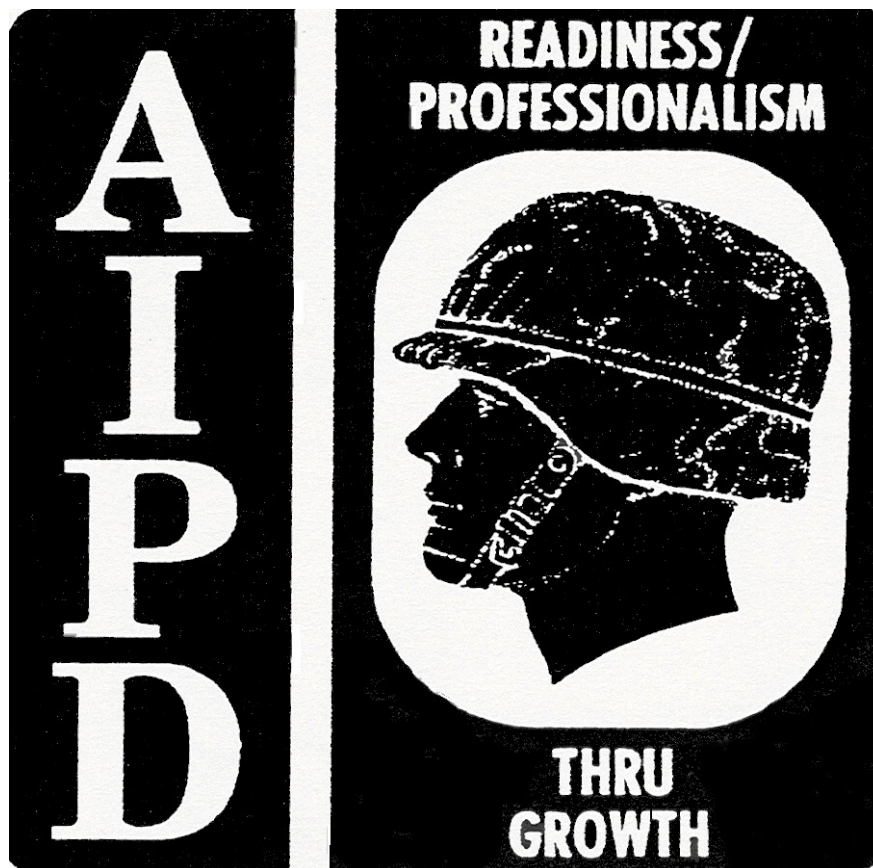


**SUBCOURSE  
IS0877**

**EDITION  
A**

# **SELF-AID/BUDDY-AID**



**THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT  
ARMY CORRESPONDENCE COURSE PROGRAM**



# **SELF-AID/BUDDY-AID**

**Subcourse Number IS0877**

**EDITION A**

**UNITED STATES ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL  
FORT SAM HOUSTON, TEXAS 78234-6100**

**20 Credit Hours**

## **INTRODUCTION**

### OVERVIEW

Interschool Subcourse 0877, Self-Aid/Buddy-Aid, contains instructions for performing self-aid/buddy-aid (first aid) tasks that all soldiers are required to know. All of the tasks within this subcourse contain important, lifesaving information.

### GENERAL

This subcourse reflects the current thought of the U.S. Army Medical Department Center and School and conforms to printed Department of the Army doctrine as closely as possible. Development and progress render such doctrine continuously subject to change.

When used in this publication, words such as "he," "him," "his," and "men" are intended to include both the masculine and feminine genders, unless specifically stated otherwise or when obvious in context.

The initial letters of the names of some products are capitalized in this subcourse. Such names are proprietary names, that is, brand names or trademarks. Proprietary names have been used in this subcourse only to make it a more effective learning aid. The use of any name, proprietary or otherwise, should not be interpreted as endorsement, deprecation, or criticism of a product; nor should such use be considered to interpret the validity of proprietary rights in a name, whether it is registered or not.

## CREDIT HOURS

Successful completion of the subcourse will result in the awarding of 20 credit hours to enrolled students. You must score a minimum of 70 percent on the subcourse examination in order to satisfactorily complete this subcourse.

## TERMINAL OBJECTIVES

**TASK:** Identify conditions requiring treatment.

**CONDITIONS:** Given a casualty on the battlefield.

**STANDARDS:** Soldier identifies airway obstructions, respiratory problems, circulation problems, open chest wounds, tension pneumothorax, bleeding, fractures, nerve agent poisoning, heat injuries, and cold injuries in accordance with the instructions presented in this subcourse.

**TASK:** Treat a casualty.

**CONDITIONS:** Given a casualty on the battlefield.

**STANDARDS:** Soldier treats airway obstructions, respiratory problems, circulation problems, open chest wounds, tension pneumothorax, bleeding, fractures, nerve agent poisoning, heat injuries, and cold injuries in accordance with the instructions presented in this subcourse.

**TASK:** Apply preventive medicine measures (self-aid).

**CONDITIONS:** Soldier deployed to a unit in the field.

**STANDARDS:** Preventive medicine measures are applied to protect against cold, heat, arthropod-borne diseases, water-borne diseases, food-borne diseases, nerve agents, hearing loss, skin infections, sexually-transmitted diseases (STD), Human immunodeficiency virus (HIV), foot problems, oral hygiene problems, and tobacco use in accordance with the instructions presented in this subcourse.

**TASK:** Transport a casualty.

**CONDITIONS:** Given a casualty in need of transportation and appropriate supplies.

**STANDARDS:** Casualty transported using an appropriate manual carry, SKED litter, or improvised litter in accordance with the instructions presented in this subcourse.

## ADMINISTRATIVE INSTRUCTIONS

There are no supervisory requirements for completion of this subcourse.

No supplementary references are required for this subcourse.

## SUGGESTED STUDY PROCEDURES

After reading a lesson, work the lesson exercises at the end of the lesson. Write your responses on a sheet of paper or on a printout of the lesson exercises. Refer to the lesson text as needed.

When you have completed the lesson exercises, compare your answers with the solution sheet following the lesson exercises. For each exercise answered incorrectly, reread the material referenced for that exercise.

Complete each lesson before proceeding to the next.

After you have completed all of the lessons and lesson exercises, complete the examination. Refer to the lessons as needed. Double check your responses.

## CONTACTS

For issues involving subcourse enrollment, grades, and student records, please contact the Army Institute for Professional Development, U.S. Army Training Support Center, Fort Eustis, Virginia, at:

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US Army Training Support Center  
Newport News, VA 23628-0001

If you wish to ask a question or make a comment related to the subject matter of the subcourse, please contact the Department of Combat Medic Training, United States Army Medical Department Center and School, Fort Sam Houston, Texas, at:

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Fort Sam Houston, TX 78234-6100

Be sure to include your name, rank, and return address on any mail sent to DCMT. Be sure to include the subcourse number, title, and edition in your correspondence. Reference the lesson, paragraph number, and/or lesson exercise number, if appropriate. For a question/comment on an examination item, include the question/stem since the item number may change if the examination is taken on line.

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Improved First Aid Kit



## **LESSON ASSIGNMENT**

### **LESSON 1**

Performing Tactical Combat Casualty Care.

### **LESSON ASSIGNMENT**

Paragraphs 1-1 through 1-5.

### **LESSON OBJECTIVES**

After completing this lesson, you should be able to:

- 1-1. Identify procedures for tactically managing a casualty under combat conditions.
- 1-2. Identify the major causes of battlefield deaths.
- 1-3. Identify the three phases of tactical combat casualty care.
- 1-4. Identify care provided in each phase of tactical combat casualty care.

### **REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
Training Support Package 071-D-2321 / First Aid 6  
(Perform Tactical Combat Casualty Care).

### **SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 1

### PERFORMING TACTICAL COMBAT CASUALTY CARE

#### 1-1. BATTLEFIELD DEATHS

a. Most combat deaths occur on the battlefield before the casualties reach a MTF. Most of these deaths are inevitable (massive trauma, massive head injuries, and so forth). However, some conditions such as bleeding from a wound on an extremity (arm or leg), tension pneumothorax, and airway problems can be treated on the battlefield. This treatment can be the difference between a combat death on the battlefield and a recovering soldier in a MTF. It has been estimated that proper use of self-aid and buddy-aid skills can reduce battlefield deaths by up to 15 percent (mostly from methods to control bleeding from the extremities). Table 1-1 gives an estimated breakdown of battlefield deaths.

b. In combat, the combat medic may not be able to reach the casualty in time to save the casualty's life, especially if the casualty is losing a great deal of blood quickly. The combat medic may even become a casualty and require aid himself. In such a situation, quick self-aid (the injured soldier treating himself) or buddy-aid (the injured soldier being treated by a fellow soldier) is needed. For example, over 2500 soldiers died in Viet Nam caused by hemorrhage from extremity wounds even though the soldiers had no other serious injuries. Proper application of pressure dressings and tourniquets by fellow soldiers could have saved most of these casualties.

<b>DEATHS CAUSED BY GROUND COMBAT</b>	
31%	Penetrating head trauma
25%	Surgically uncorrectable torso trauma
10%	Potentially correctable surgical trauma
9%	Exsanguination (bleeding) from extremity wounds
7%	Mutilating blast trauma
5%	Tension pneumothorax
1%	Airway problems
12%	Died of Wounds after being evacuated to a medical treatment facility (usually from infections and complications of shock)

Table 1-1. Estimated breakdown of battlefield deaths.

## 1-2. TACTICAL COMBAT CASUALTY CARE

Tactical combat casualty care (TCCC) can be divided into three phases. The first is care under fire; the second is tactical field care; the third is combat casualty evacuation care.

a. **Care Under Fire.** In a situation in which the casualty and you are under hostile fire, you are very limited as to the care you can provide. Paragraph 1-3 discusses this situation.

b. **Tactical Field Care.** In tactical field care, you and the casualty are in a protected or safe environment. In this situation, you are free to provide casualty care to the best of your ability. Paragraph 1-4 discusses this situation.

c. **Combat Casualty Evacuation Care.** In the third situation, care is being given to the casualty during casualty evacuation (CASEVAC). Casualty evacuation refers to the care given to the casualty while the casualty is awaiting pickup or is being transported by a nonmedical vehicle, such as a vehicle used to transport troops or supplies. Paragraph 1-5 discusses this situation.

**NOTE:** Casualty evacuation is different from medical evacuation (MEDEVAC). In MEDEVAC, a designated medical vehicle (ground ambulance or air ambulance) is used.

## 1-3. PERFORMING CARE UNDER FIRE

Care under fire is rendered at the scene of the injury while you and the casualty are still under effective hostile fire. In such a situation, you should perform the following actions.

- a. Return fire as directed or required before providing medical treatment.
- b. Determine if casualty is alive or dead.
- c. Provide tactical care to the live casualty. Reducing or eliminating enemy fire may be more important to the casualty's survival than the treatment you can provide.
  - (1) Suppress enemy fire.
  - (2) Use cover or concealment (smoke) to conceal the casualty, if possible.
  - (3) If the casualty is able, direct him to return fire, move to cover, and administer self-aid (control bleeding). If the casualty is unable to move and you are unable to move the casualty to cover, have casualty "play dead."

- (4) Keep the casualty from sustaining additional wounds.
- (5) Reassure the casualty.

d. If you can safely move the casualty to safety, do so. Administer only life-saving hemorrhage control while still under enemy fire.

**NOTE:** Hemorrhage refers to serious bleeding.

(1) If the casualty has severe bleeding from a limb or has suffered amputation of a limb, quickly apply a tourniquet before moving the casualty to safety. Do not take time to check the casualty for breathing or airway obstruction.

(2) Move the casualty, his weapon, and any mission-essential equipment to cover as the tactical situation permits. Do not take the time to move equipment that is not mission essential.

**NOTE:** You must determine the relative threat of the tactical situation versus the risk to the casualty. Can you remove the casualty to a place of relative safety without becoming a casualty yourself? Is the casualty safer where he is? If possible, seek guidance and assistance from your leader.

e. Recheck the bleeding control measures as the tactical situation permits.

#### **1-4. PERFORMING TACTICAL FIELD CARE**

Perform tactical field care when you and the casualty are no longer under direct enemy fire.

**NOTE:** Tactical field care also applies to situations in which an injury has occurred on a mission when there is no hostile fire. Available medical supplies are limited to those carried into the field by individual soldiers.

a. **Communication.** Communicate the medical situation to the unit leader. Ensure that the tactical situation allows time to treat the casualty before initiating treatment procedures. Inform the unit leader if:

- (1) The casualty will not be able to continue his mission.
- (2) There is any significant change in casualty's status.

b. **General Impression.** Form a general impression of the casualty as you approach (extent of injuries, chance of survival, and so forth). Continue to evaluate the tactical situation for possible danger to yourself and the casualty.

**NOTE:** If the casualty has suffered from a blast or penetrating trauma and has no signs of life (no pulse, no respirations), do not perform cardiopulmonary resuscitation (CPR). These casualties will probably not survive and you may expose yourself to enemy fire.

c. **Level of Consciousness.** When possible, determine the casualty's level of consciousness using the AVPU system. Ask questions that require more than a "yes" or "no" answer, such as, "What is your name? What is the date? Where are we?" Recheck the casualty's level of consciousness about every 15 minutes to determine if the casualty's condition has changed. Report your findings to the combat medic or combat lifesaver when he comes.

- (1) A--The casualty is alert, knows who he is, the date, where he is, etc.
- (2) V--The casualty is not alert, but does responds to verbal commands.
- (3) P--The casualty responds to pain, but not verbal commands.
- (4) U--The casualty is unresponsive.

**NOTE:** Maintaining a check on the casualty's level of consciousness is especially important when the casualty has suffered a head injury.

**NOTE:** If the casualty is alert or responds to voice, do not check the casualty's response to pain.

**NOTE:** To check a casualty's response to pain, rub his breastbone briskly with a knuckle or squeeze his first.

d. **Airway.** Assess and secure the casualty's airway.

(1) If the casualty is conscious, able to speak, and is not in respiratory distress, no airway intervention is needed.

(2) If the casualty is unconscious, perform the following.

(a) Use a head-tilt/chin-lift or jaw thrust to open the airway. The head-tilt/chin-lift is the normal method of opening the casualty's airway. The jaw thrust is used if you suspect the casualty has suffered injury to the head, jaw, or spine (back).

**NOTE:** The muscles of an unconscious casualty's tongue may have relaxed, causing his tongue to slide to the back of his mouth and cover the opening to his trachea (windpipe). Using the head-tilt/chin-lift or jaw thrust removes the blockage by moving the tongue away from the trachea. Moving the tongue away from the opening to the trachea may result in the casualty breathing on his own again without the need for rescue breathing techniques.

(b) Check the casualty for breathing. Place your ear over the casualty's mouth and nose with your face toward the casualty's chest while maintaining the casualty's airway (head-tilt/chin-lift or jaw-thrust). Look for the rise and fall of the casualty's chest and abdomen. Listen for sounds of breathing. Feel for his breath on the side of your face.

1 If the casualty is not breathing, begin rescue breathing.

2 If the casualty is breathing on his own, insert a nasopharyngeal airway (NPA) to maintain the airway.

**NOTE:** Procedures for opening the airway, performing rescue breathing, and inserting a nasopharyngeal airway are described in Lesson 3 of this subcourse.

e. **Chest.** Assess and treat the casualty for chest injuries (Lesson 4).

(1) Expose the chest and check for equal rise and fall. Remove the minimum of clothing required to expose and treat injuries. Protect the casualty from the environment (heat and cold) as much as possible.

(2) Examine the chest for wounds. Check for both entrance and exit wounds (sucking chest wounds).

(3) Immediately seal any penetrating injuries to the chest with an occlusive dressing. Sealing the wound keeps air from entering the wound. If air can freely enter through the wound, the casualty's affected lung will collapse.

(4) Monitor the casualty for progressive severe respiratory distress (breathing becomes more labored and faster). If respiration becomes progressively worse, consider this a tension pneumothorax and decompress the affected chest side with a 14-gauge needle inserted at second intercostal space (ICS) at midclavicular line (MCL). Secure the catheter in place.

**CAUTION:** Only perform needle chest decompression on a casualty with a penetrating (sucking) chest wound.

f. **Bleeding.** Identify and control major bleeding (see Lesson 5).

(1) Apply a tourniquet to a major amputation of the extremity.

(2) Apply an emergency bandage and direct pressure to a severely bleeding wound.

(a) If conventional methods of controlling severe bleeding (emergency bandage, direct pressure, pressure dressing, hemostatic dressing, and so forth) do not control the bleeding on an extremity, apply a tourniquet.

(b) If a tourniquet was previously applied, consider changing the tourniquet to an emergency bandage or pressure dressing to control bleeding. Leave the tourniquet in place while doing this. Loosen it, but do not remove it. If conventional methods are not able to control hemorrhage, retighten the tourniquet until bleeding stops.

**NOTE:** By converting the tourniquet to a pressure dressing or controlling the bleeding by other methods, you may be able to save the limb of the casualty if the tourniquet has not been in place for 6 hours. If tourniquet has been in place for more than 6 hours do not remove the tourniquet.

g. **Other Wounds.** Identify and treat other wounds. Dress all wounds, including exit wounds. Remember to remove only the minimum of clothing required to expose and treat injuries. Protect the casualty against the environment (hot and cold temperatures, and so forth).

h. **Fractures.** Splint any obvious long bone fractures (see Lesson 6).

i. **Combat Pill Pack.** Administer pain medications and antibiotics (combat pill pack) to any soldier wounded in combat. Do not administer your own pack since you may need them yourself and you have no extra combat pill packs in your aid bag.

**NOTE:** Each soldier will be issued a combat pill pack prior to deployment on tactical missions.

j. **Positioning the Casualty.**

(1) Usually, you will roll the casualty onto his side and position the casualty's arms and legs to stabilize him in the recovery position (figure 1-1). This position allows accumulated blood and mucus to drain from the casualty's mouth instead of choking the casualty. This is especially important if the casualty is unconscious and you cannot stay with him.

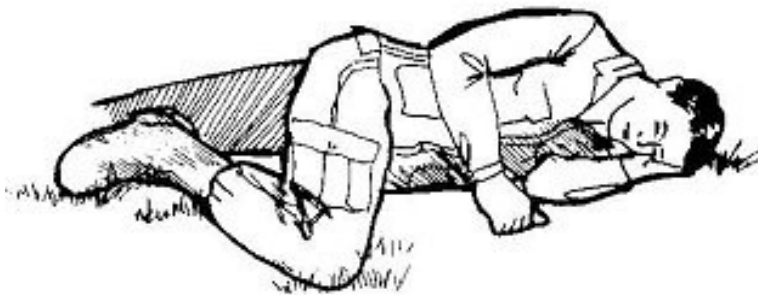


Figure 1-1. Unconscious casualty placed in the recovery position.

(a) If the casualty has an open chest wound without a needle chest decompression, position the casualty with the injured side toward the ground. The body pressure acts to "splint" the affected side.

(b) If a needle chest decompression has been performed, position the casualty with the uninjured side toward the ground.

(2) For some injuries, the recovery position is not used. For example, a soldier with an abdominal wound is positioned on his back with his knees flexed (knees raised with the bottoms of his feet on the ground). If the casualty is being treated for shock (severe blood loss, and so forth), the casualty is placed on his back with his feet elevated (placed on a log, pack, or other stable object).

### **1-5. PERFORMING COMBAT CASUALTY EVACUATION CARE**

Prepare the casualty for evacuation, if needed.

a. When possible, the casualty is transported by medical ambulance (helicopter or ground ambulance) to a medical treatment facility (MTF). If a medical ambulance is used to transport a casualty, it is called medical evacuation (MEDEVAC).

b. If a ground or air ambulance is not available, the casualty may be transported by nonmedical means. For example, a truck used to haul troops or supplies may be used to transport casualties to a medical treatment facility. When nonmedical vehicles are used to transport a casualty, it is called casualty evacuation (CASEVAC).

c. Sometimes a casualty must be moved to another area where he can be placed on a vehicle, either MEDEVAC or CASEVAC. If the casualty needs to be carried, he should be moved on a litter. Lesson 7 describes how to prepare and use the SKED<sup>®</sup> litter and how to make improvised litters.



## LESSON EXERCISES: LESSON 1

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. Of the deaths that occur during ground combat, about what percent die before reaching a medical treatment facility?
  - a. 10 percent.
  - b. 20 percent.
  - c. 50 percent.
  - d. 90 percent.
  
2. Your unit is in ground combat. You see a soldier fall as though he has been shot. Your primary duty is to:
  - a. Continue firing at the enemy.
  - b. Stop firing and go to the fallen soldier.
  
3. Of the following types of deaths occurring during ground combat and before reaching a medical treatment facility, select the type of preventable death from which more soldiers died.
  - a. Tension pneumothorax.
  - b. Blocked airway.
  - c. Bleeding from wounds to the extremities.
  - d. Heart attack.

4. What is the only aid rendered while under fire?
  - a. Perform cardiopulmonary resuscitation.
  - b. Control bleeding with a tourniquet.
  - c. Relieve tension pneumothorax.
  - d. Control pain and infection.
  
5. You and a casualty are under fire. The casualty is conscious and able to fire his weapon. What should you tell him to do?

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6. You and a casualty are under fire. The casualty has a severe wound to the arm. You can administer treatment without endangering the mission. What treatment should you administer?

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7. You have been wounded and are still under enemy fire. You are unable to return fire and there is no safe cover nearby. What should you do?

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8. You can move a casualty out of enemy fire. Should you try to retrieve his weapon also?
  - a. Yes, if the tactical situation permits.
  - b. Yes, under all circumstances.
  - c. No.

9. A nasopharyngeal air is inserted to maintain the casualty's airway as part of:
- Care under fire.
  - Tactical field care.
  - Both care under fire and tactical field care.

10. What is in the combat pill pack that you and other soldiers carry in combat?
- 

11. Why must a penetrating chest wound be sealed?
- To keep air from entering through the wound.
  - To keep air from escaping through the wound.
  - To control bleeding.

12. You are going to administer a combat pill pack to a casualty. You should administer:
- The casualty's pack.
  - Your personal pack.

13. Classify the following casualties according to the AVPU system.

\_\_\_\_ Casualty number one moves his arm when you tell him forcefully to do so and responds to pain when you moved him , but does not respond otherwise.

\_\_\_\_ Casualty number two does not appear to have any injuries other than a bruise on the side of his head; however, he does not respond to anything you do.

\_\_\_\_ Casualty number three has been shot in the leg and is yelling at you to "Hurry and do something." \_\_\_\_ Casualty number four groans when you try to move his injured leg, but does not respond when you ask him how he feels or tell him to move his uninjured arm.

14. What is the most likely cause of a blocked airway in an unconscious casualty?

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15. When opening an unconscious casualty's airway, you should normally use the \_\_\_\_\_ method. However, if you suspect a head or spinal injury, the \_\_\_\_\_ method is preferred.

16. You find a casualty that appears to be unconscious. You are not in danger from enemy fire and have time to perform care. In which order should you perform the following tasks? Write "1" in the space before the first task you would perform, "2" in the space before the next task you would perform, and so forth.

\_\_\_\_\_ Apply a pressure dressing to a serious wound on the casualty's arm.

\_\_\_\_\_ Check the casualty for breathing using Look, Listen, and Feel.

\_\_\_\_\_ Open the casualty's airway using the head-tilt/chin-lift.

\_\_\_\_\_ Splint the casualty's fractured leg.

\_\_\_\_\_ Apply a seal to an open chest wound.

17. You must leave an unconscious casualty to perform other duties. How should you normally position the casualty before you leave?

a. On his back.

b. On his side.

c. On his chest.

d. In whatever position you originally found him.

18. Why did you position the casualty in exercise 17 in the manner you chose?

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19. A casualty is to be evacuated to a military medical treatment facility. If the casualty is transported using a medical ground or air ambulance, it is called a \_\_\_\_\_ . If a truck normally used to carry supplies to troops in the field is used to transport the casualty, it is called a \_\_\_\_\_ .

## SOLUTIONS TO LESSON EXERCISES: LESSON 1

1. d (para 1-1a, Table 1-1)
2. a (para 1-3)
3. c (Table 1-1)
4. b (paras 1-3d, d(1))
5. Return fire (para 1-3c(3))
6. Tourniquet (para 1-3d(1))
7. Play dead (para 1-3c(3))
8. a (para 1-3d(2))
9. b (para 1-4d(2)(b)2)
10. Pain medication and antibiotics (para 1-4i)
11. a (para 1-4e(3))
12. a (para 1-4i)
13. Casualty number one: V  
Casualty number two: U  
Casualty number three: A  
Casualty number four: P (para 1-4c)
14. Casualty's tongue relaxes, slides to the back of the mouth and covers the opening to the trachea (para 1-4d(2) NOTE).
15. Head-tilt/chin-lift  
Jaw thrust (para 1-4d(2)(a))
16. 4 Apply a pressure dressing to a serious wound on the casualty's arm.  
2 Check the casualty for breathing using Look, Listen, and Feel.  
1 Open the casualty's airway using the head-tilt/chin-lift.  
5 Splint the casualty's fractured leg.  
3 Apply a seal to an open chest wound.  
(paras 1-4d, e, f, h)

17. b (para 1-4j(1), fig 1-1).
18. This position allows accumulated blood and mucus to drain from the casualty's mouth (para 1-4j(1))
19. Medical evacuation (MEDEVAC) (para 1-5a)  
Casualty evacuation (CASEVAC) (para 1-5b)





## **LESSON ASSIGNMENT**

### **LESSON 2**

Evaluating a Casualty.

### **LESSON ASSIGNMENT**

Paragraphs 2-1 through 2-9.

### **LESSON OBJECTIVES**

After completing this lesson, you should be able to:

- 2-1. Identify procedures for evaluating a casualty under combat conditions.
- 2-2. Identify the proper sequence of actions used in evaluating a casualty.
- 2-3. Identify the procedures for turning a casualty onto his back.
- 2-4. Identify the procedures for checking a casualty for breathing.
- 2-5. Identify the procedures for checking a casualty for bleeding.

### **REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
FM 100-14, Risk Management.  
Training Support Package 071-D-2316 / First Aid 1  
(Evaluate a Casualty for Life-Threatening  
Conditions).

### **SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 2

### EVALUATING A CASUALTY

#### 2-1. INTRODUCTION

This lesson assumes that you are in a combat situation, there is a wounded soldier in need of help, and you can provide care without endangering your combat mission.

#### WARNING

If there are any signs of nerve agent poisoning, stop the evaluation, take the necessary NBC protective measures, and then resume appropriate first aid measures (Lesson 8).

#### 2-2. ACTIONS BEFORE APPROACHING THE CASUALTY

Take the following actions before approaching the casualty on the battlefield. Remember to protect yourself.

- a. Scan the area for potential danger.
  - (1) Survey the area for small arms fire.
  - (2) Detect area for fire or explosive devices.
  - (3) Determine threat for chemical or biological agents.
  - (4) Survey buildings, if any, for structural stability.
- b. Determine the best route of access to the casualty and the best route of egress. If you need to move the casualty to a safer area, be sure to select an area that provides optimum cover and concealment. Plan your evacuation route prior to exposing yourself to possible hostile fire.
- c. Request covering fire to reduce the risk to yourself and the casualty during movement to and from the casualty's location.
- d. Anticipate the type of injuries the casualty may have received and what care will probably be needed. Did the casualty fall from a wall (broken bones)? Was there an explosion (blast effects)? Was there only small arms fire (bleeding wounds)?

e. Anticipate how your actions (movement, noise, light, etc.) may affect the enemy's fire.

f. Decide what care you can administer to the casualty when you reach him and what care will have to wait until you have returned the casualty to a place of safety.

### **2-3. INITIAL ACTIONS**

Remember, if you and the casualty are still under effective hostile fire, return fire as directed or required. Do not expose yourself to enemy fire in order to provide care.

a. If possible, determine if casualty is alive or dead.

b. Provide tactical care to the live casualty.

(1) Suppress enemy fire. Reducing enemy fire may be more important to the casualty's survival than the treatment you can provide.

(2) If the casualty can function, direct him to return fire, move to cover, and administer self-aid.

(3) If the casualty is unable to return fire or move to safety and you cannot assist him, tell the casualty to "play dead."

c. When the combat situation allows you to safely assist the casualty, do so.

(1) Approach the casualty by the safest route.

(2) Form a general impression as you approach the casualty (extent of injuries, chance of survival, and so forth).

(3) If you are still exposed to enemy fire, apply a tourniquet if there is a limb with severe, life-threatening bleeding and move the casualty and yourself to a safe location. DO NOT take time to evaluate the casualty's breathing until you and the casualty are in a safe location.

(4) If you move the casualty and yourself to a safer location, take the casualty's weapon and other mission-essential equipment with you.

### **2-4. CHECKING THE CASUALTY FOR RESPONSIVENESS**

a. To check the casualty for responsiveness:

(1) Ask in a loud, but calm, voice: "Are you okay?" Gently shake or tap the casualty on the shoulder.

(2) Determine level of consciousness by using AVPU (A = Alert; V = responds to Voice; P = responds to Pain; U = Unresponsive). See paragraph 1-4c of Lesson 1 for additional information.

**NOTE:** If the casualty is alert or responds to voice, do not check the casualty's response to pain.

**NOTE:** To check a casualty's response to pain, rub his breastbone briskly with a knuckle or squeeze his fist.

b. If the casualty is conscious, ask where it hurts or where his body feels different than usual. This helps to determine the level of responsiveness and provides you with information that can be used when treating the casualty.

c. If the casualty is unconscious, position the casualty on his back, open his airway (Lesson 3) and check for breathing. Opening his airway may result in the casualty's level of consciousness being upgraded.

d. If the casualty is conscious, evaluate his breathing and see if a nasopharyngeal airway is needed.

## **2-5. POSITIONING THE CASUALTY ON HIS BACK**

Position the casualty on his back if he is not already lying on his back. To turn a casualty lying on his front onto his back, perform the following steps.

**NOTE:** It is assumed that you and the casualty are in a protected area. If you are still exposed to enemy fire, apply a tourniquet to control any severe bleeding and move the casualty and yourself to a safe location.

a. Kneel beside the casualty with your knees near his shoulders, leaving space to roll the body.

b. Take the casualty's arm that is nearest to you and move it so that it is straight and above his head. Repeat the procedure with the other arm.

c. Adjust the casualty's legs so that they are together and straight or nearly straight.

d. Place one hand behind the head or neck for support.

e. Reach across the casualty with your free hand and grasp the casualty under the far arm (armpit area).

f. Pull steadily and evenly toward yourself, keeping the head and neck in line with the torso.

g. Roll the casualty as a single unit. The head and neck should stay in line.

h. Once the casualty is rolled onto his back, place his arms at his sides.

**NOTE:** This method of rolling the casualty is used to minimize further injury to the casualty's spine in case he has suffered an injury to the head, neck, or back.

## **2-6. CHECKING THE CASUALTY FOR BREATHING**

Check the casualty for breathing and for injuries that could affect his respirations.

**NOTE:** If the casualty is conscious and talking, his breathing is satisfactory for now. However, continue to monitor the casualty's breathing since swelling throat tissue, bleeding into the throat, or other injuries could require you to establish an airway and perform rescue breathing.

a. Look, listen and feel for respirations. If the casualty is breathing, determine if the breathing rate is normal, rapid, or slow.

(1) Place your ear about one inch above the casualty's mouth and nose. Listen for breathing. Look at the casualty's chest to see if it is rising and falling.

(2) Feel for breathing by placing your cheek about one inch above the casualty's mouth and nose. Feel for air being exhaled.

**NOTE:** If the casualty is not breathing, stop the evaluation and try to restore the airway using the head-tilt/chin-lift or jaw thrust, then check for breathing again. If you cannot detect breathing, proceed to perform rescue breathing (see Lesson 3).

**NOTE:** In a combat situation, if you find a casualty with no signs of life (no breathing and no pulse), do not attempt to restore the airway. Do not attempt to perform cardiopulmonary resuscitation. Do not continue first aid measures.

(3) Count the casualty's respirations (one inhalation and one expiration together is one respiration) for 15 seconds. If the casualty has less than two respirations during the 15 seconds, insert a nasopharyngeal airway (Lesson 3) after checking for open chest wounds.

b. Expose the casualty's chest to look for equal rise and fall of the chest and for wounds.

(1) If the casualty's chest is not rising and falling evenly, make a mental note and proceed with the evaluation.

(2) If the casualty has a penetrating chest wound and is breathing or making an effort to breathe, stop the evaluation and apply an occlusive dressing (Lesson 4) to seal the penetrating wound.

**NOTE:** Check for entrance and exit wounds to the chest. If an entrance wound and an exit wound are present, both must be sealed.

(3) If the casualty has a penetrating chest wound, is not breathing, and is making no effort to breathe, do not attempt to treat the injury.

## **2-7. CHECKING THE CASUALTY FOR BLEEDING**

a. Look for blood-soaked clothes.

b. Look for entry and exit wounds.

c. Place your hands behind the casualty's neck and pass them upward toward the top of the head. Note whether there is blood or brain tissue on your hands from the casualty's wounds.

d. Place your hands behind the casualty's shoulders and pass them downward behind the back, the thighs, and the legs. Note whether there is blood on your hands from the casualty's wounds.

e. If life-threatening bleeding from an extremity (arm or leg) is present, stop the bleeding using a tourniquet or emergency bandage (Lesson 5).

## **2-8. ADDITIONAL CARE**

a. After any needed immediate life-saving aid has been administered, perform additional care. For example, bandage other wounds (Lesson 5) and splint major fractures (Lesson 6).

b. If possible, send a soldier to find a combat medic.

c. Administer additional care until the combat medic arrives or until you are told to resume your combat duties. Now that you are in a safe area, you can render care that you could not administer while under fire.

d. Reassure the casualty. Show confidence in your actions.

e. Continue to monitor the casualty's breathing.

(1) If the casualty's breathing rate falls below two breaths every 15 seconds, insert a nasopharyngeal airway (Lesson 3).

(2) If tension pneumothorax develops, perform a needle chest decompression (Lesson 4).

f. If needed, prepare the casualty for evacuation (Lesson 7).

## **2-9. CLOSING**

a. As discussed in Lesson 1, there are three primary preventable causes of death from injury on the battlefield. You are able to help prevent death from all three causes. The preventable causes of battlefield deaths are:

(1) Severe bleeding from an arm or leg wound (apply a tourniquet or emergency dressing).

(2) Collapsed lung (perform needle chest decompression).

(3) Blockage of the nose and throat from an injury to the face (insert a nasopharyngeal airway).

b. Remember, there are times when you should not provide care. Do not take time to treat an injured soldier if:

(1) You are under fire and providing care places your own life in immediate danger.

(2) Taking time to provide care will endanger the combat mission.

(3) The casualty does not have vital (life) signs; that is, the casualty is not breathing, does not have a pulse, and is not moving.

(4) The casualty's injury is probably not survivable given the battlefield situation. Examples of such injuries are:

(a) Penetrating head injuries with brain tissue exposed.

(b) Severe burns covering a large part of the body.

(c) Mutilating blast injuries.

## LESSON EXERCISES: LESSON 2

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. You are going to the aid of an injured soldier on the battlefield. Which of the following should you do first?
  - a. Scan the area for possible dangers.
  - b. Check the soldier's pulse.
  - c. Check the soldier for breathing.
  - d. Check the soldier for bleeding.
  
2. The casualty is lying on his back. You see a penetrating wound to the front of a casualty's chest. Which of the following is true?
  - a. You only need to seal the visible chest wound.
  - b. You need to check for both entrance and exit wounds to the chest and seal both.
  
3. Your unit has received fire from the enemy. A fellow soldier has been wounded and cannot seek shelter on his own. You determine that you can reach the soldier without serious risk to yourself. When should you plan how you will move the soldier to safety?
  - a. Before you leave your place of safety to go to the wounded soldier.
  - b. As soon as you reach the wounded soldier.
  - c. As soon as you have treated the life-threatening conditions.
  - d. As soon as you have treated all of the casualty's injuries.



4. You unit is receiving enemy fire. You have safely reached a wounded casualty. The casualty has a penetrating chest wound, is not breathing, and is making no effort to breathe. What should you do?
  - a. Begin performing cardiopulmonary resuscitation.
  - b. Seal the chest wound(s).
  - c. Apply a tourniquet and move the casualty to a place of safety.
  - d. Do not try to treat the casualty; seek safety for yourself.
  
5. You are determining the casualty's level of responsiveness. The casualty tells you that he has been shot. Should you test the casualty's responsiveness to pain?
  - a. Yes, a full testing is needed.
  - b. No, you already have sufficient information to make a determination that the casualty is alert.
  
6. When evaluating a casualty's breathing, the casualty should be in what position?
  - a. On his back (supine).
  - b. On his chest (prone).
  - c. Lying on his injured side.
  - d. Lying on his uninjured side.
  
7. Which of the following should you treat first if exposed to enemy fire?
  - a. Bleeding.
  - b. Breathing difficulties with a penetrating chest wound.

8. Which of the following should you treat first if you and the casualty are in a protected area?

a. Bleeding.

b. Breathing difficulties with a penetrating chest wound.

9. How does evaluation and treatment of a casualty in a secure situation differ from that in a combat (under fire) situation?

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10. What are the three principal preventable causes of death on the battlefield?

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11. What are three situations in which you would not treat a casualty?

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12. You are going to turn a casualty lying on his front onto his back. Which of the following is correct.
- a. Place his near arm above his head and his far arm by his side.
  - b. Place his far arm above his head and his near arm by his side.
  - c. Place both of his arms above his head.
  - d. Place both of his arms by his sides.
13. You are evaluating the responsiveness of a casualty. He does not respond when you shake his shoulder or tell him to move his arm. Your next step would be to check the casualty's response to \_\_\_\_\_ . List two ways of performing this test
- 
- 
14. Practice performing an evaluation on a simulated casualty.

## SOLUTIONS TO LESSON EXERCISES: LESSON 2

1. a (para 2-2a)
2. b (paras 2-6b(2), b(2) Note)
3. a (para 2-2b)
4. d (paras 2-6b(3), 2-9b); this casualty will not survive and you may expose yourself to enemy fire.
5. b (para 2-4a(2) first Note)
6. a (paras 2-4c, 2-5)
7. a (para 2-3c(3))
8. b (paras 2-6, 2-7)
9. In a secure environment, immediate danger from enemy fire will not be a factor. This will allow you to focus more on the evaluation, treatment, and evacuation of the casualty without worrying about danger to yourself.  
(para 2-8c)
10. Severe bleeding from an arm or leg wound.  
Collapsed lung (tension pneumothorax).  
Blockage of the nose and throat from an injury to the face. (para 2-9a)
11. [Any three of the following]  
Your own life is in imminent danger.  
Your combat duties do not allow time to care for casualties.  
The casualty does not have vital signs.  
The casualty's injury is not survivable.  
Your combat duties do not allow you to treat the casualty. (para 2-9b)
12. c (para 2-5b)
13. pain  
Rub his breastbone briskly with a knuckle  
Squeeze his fist.  
(paras 2-4a(2) second note,
14. You should perform the steps in the following checklist and in the sequence given on the checklist.

## CHECKLIST FOR EVALUATING A CASUALTY

Situation: You have spotted a casualty (simulated). Your area is not under fire. The casualty is lying in a prone position.

	GO	NO-GO
Establishes security of the site.	_____	_____
Forms an impression of the casualty's condition.	_____	_____
Checks for responsiveness.	_____	_____
Positions the casualty on his back.	_____	_____
Checks the casualty for breathing.	_____	_____
Checks the casualty for bleeding.	_____	_____
Sends a soldier to get medical help. (Note: This step can be performed at any time.)	_____	_____
OVERALL EVALUATION (A no-go on any step gives an overall evaluation of no-go.)	GO	NO GO



## LESSON ASSIGNMENT

### LESSON 3

Opening and Managing a Casualty's Airway.

### LESSON ASSIGNMENT

Paragraphs 3-1 through 3-19.

### LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 3-1 Given information about a simulated casualty, determine what should be done to open or maintain the casualty's airway.
- 3-2. Identify the procedures for performing a head-tilt/chin-lift.
- 3-3. Identify the procedures for performing a jaw thrust.
- 3-4. Identify the procedures for performing rescue breathing.
- 3-5. Identify the procedure for inserting a nasopharyngeal airway.
- 3-6. Identify the procedures for removing an obstruction from a casualty's airway.
- 3-7. Identify the procedures for performing cardiopulmonary resuscitation.

### REFERENCES

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
Training Support Package 071-D-2317 / First Aid 2  
(Manage the Airway)  
Training Support Package 071-D-2323 / First Aid 8  
(Perform Cardiopulmonary Resuscitation-CPR)

### SUGGESTION

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 3

### OPENING AND MANAGING A CASUALTY'S AIRWAY

#### Section I. ON THE BATTLEFIELD

##### 3-1. MOVING TO SAFETY

If a casualty is not breathing, you must take measures to restore respiration (breathing) as soon as possible. If you are under enemy fire, quickly move yourself and the casualty to a location where you can safely administer measures to restore breathing. (See Lessons 1 and 2.)

##### 3-2. CHECKING THE CASUALTY FOR RESPONSIVENESS

If the casualty appears to be unconscious, check the casualty for responsiveness. Ask in a loud, but calm, voice: "Are you okay?" Also, gently shake or tap the casualty on the shoulder. If the casualty does not respond, open his airway.

##### 3-3. POSITIONING THE CASUALTY

If the casualty is not on his back, turn him onto his back using the procedures given in paragraph 2-5 of Lesson 2.

##### 3-4. OPENING THE CASUALTY'S AIRWAY

When a casualty becomes unconscious, all of his muscles may relax. This relaxation may cause the casualty's tongue to slip to the back of his mouth and cover the opening to his trachea (windpipe). Removing the obstruction and opening the airway may allow the casualty to resume breathing on his own. Two approved methods of opening the casualty's airway are the head-tilt/chin-lift method and the jaw thrust method. If you suspect that the casualty has suffered a neck or spinal injury, use the jaw thrust method. Otherwise, use the head-tilt/chin-lift method.

**NOTE:** Even if the casualty is still breathing, positioning the airway will allow him to breathe easier.

**NOTE:** If you see something in the casualty's mouth (foreign material, loose teeth, dentures, facial bone, vomitus, etc.) that could block his airway, use your fingers to remove the material as quickly as possible.



**a. Head-Tilt/Chin-Lift Method.**

**CAUTION:** Do not use this method if a spinal or neck injury is suspected.

- (1) Kneel at the level of the casualty's shoulders.
- (2) Place one of your hands on the casualty's forehead and apply firm, backward pressure with the palm of your hand to tilt the head back.
- (3) Place the fingertips of your other hand under the tip of the bony part of the casualty's lower jaw and bring the chin forward. See figure 3-1.
- (4) Lift the chin forward until the upper and lower teeth are almost brought together. The mouth should not be closed as this could interfere with breathing if the nasal passages are blocked or damaged. If needed, the thumb may be used to depress the casualty's lower lip slightly to keep his mouth open.

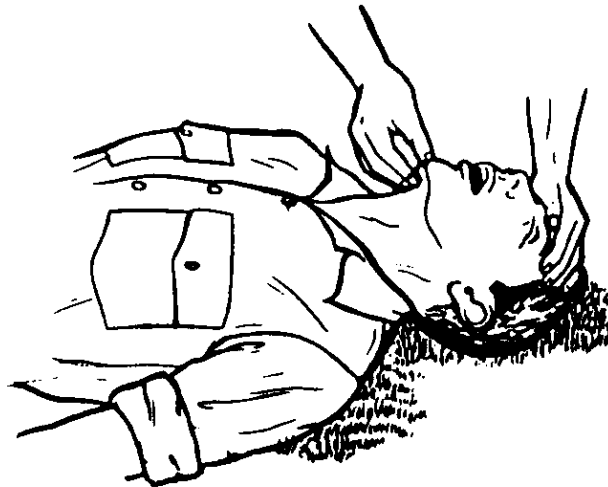


Figure 3-1. Opening the airway using the head-tilt/chin-lift method.

**CAUTION:** Do not use the thumb to lift the lower jaw.

**CAUTION:** Do not press deeply into the soft tissue under the chin with the fingers as this could close the casualty's airway.

**CAUTION:** Do not allow the casualty's mouth to close. The mouth must remain open so the casualty can breath air in and out.

**b. Jaw Thrust Method.**

- (1) Kneel at the top of the casualty's head.
- (2) Rest your elbows on the surface where casualty is lying (ground, etc.).
- (3) Place one hand on each side of the casualty's lower jaw at the angle of the jaw, below the ears.
- (4) Stabilize the casualty's head with your forearms.
- (5) Use the index fingers to push the angles of the patient's lower jaw forward.
- (6) Use the thumb to retract the patient's lower lip to keep the casualty's mouth open, if necessary. See figure 3-2.

**CAUTION:** Do not tilt or rotate the casualty's head.

**CAUTION:** Do not allow the casualty's mouth to close. The mouth must remain open so the casualty can breath air in and out.

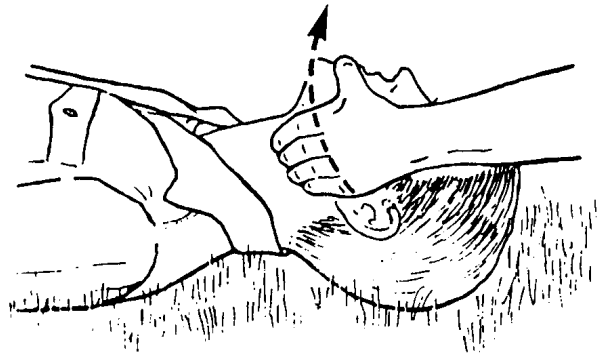


Figure 3-2. Opening the airway using the jaw thrust method.

**3-5. CHECKING THE CASUALTY FOR BREATHING**

While maintaining the open airway position (head-tilt/neck-lift or jaw thrust), place your ear over the casualty's mouth and nose and look toward the chest and stomach (figure 3-3).

- a. Look to see if the casualty's chest rises and falls.
- b. Listen for air escaping during exhalation.
- c. Feel for the flow of air on the side of your face.

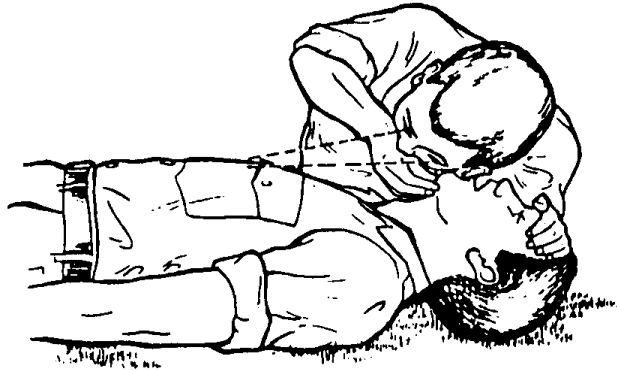


Figure 3-3. Checking for signs of breathing while maintaining an open airway.

d. Take appropriate action.

(1) If the casualty is not breathing, begin rescue breathing.

(2) If the casualty is breathing, count the number of respirations for 15 seconds. If the casualty is unconscious, or if his respiratory rate is less than two breaths in 15 seconds, and/or if the casualty is making snoring or gurgling sounds, insert a nasal airway (paragraph 3-6) and place the casualty in the recovery position (paragraph 3-7).

### **3-6. PERFORMING RESCUE BREATHING (MOUTH-TO-MOUTH)**

Rescue breathing is performed when the casualty is not breathing on his own. In rescue breathing, you use air from your own lungs to inflate the casualty's lungs. Keep the casualty on his back and maintain the casualty's airway using the head-tilt/chin-lift or jaw thrust, as appropriate.

**NOTE:** If you have a face shield available, insert the shield into the casualty's mouth, with the short airway portion over the top of the tongue and flatten the plastic sheet around the mouth to cover the casualty's mouth, use it. The shield acts as a barrier protecting the rescuer from secretions from the casualty's mouth.

a. **Close Casualty's Nose.**

(1) If you are using the head-tilt/chin-lift, use the thumb and index finger of your hand on the casualty's forehead to gently pinch the casualty's nostrils closed while continuing to exert pressure on the casualty's forehead to maintain the backward head tilt position.

(2) If you are using the jaw thrust, close the casualty's nostrils by placing your cheek tightly against the nose.

**b. Administer Two Full Breaths.**

(1) Open your mouth wide and take a deep breath.

(2) Place your mouth over the casualty's mouth. Make sure that your mouth forms a good seal around the casualty's mouth so air will not escape when you blow air into the casualty's mouth. Make sure that the fingertips under the chin keep the jaw lifted. Maintaining the open airway will keep the casualty's mouth open slightly.

(3) Blow a breath into the casualty's mouth (figure 3-4). As you blow, observe the casualty's chest. If air is getting into the casualty's lungs, his chest will rise.

(4) After blowing the first breath, quickly take a deep breath, seal your mouth over the casualty's mouth again, and blow. Administering the two breaths (ventilations) should take about 3 to 4 seconds.

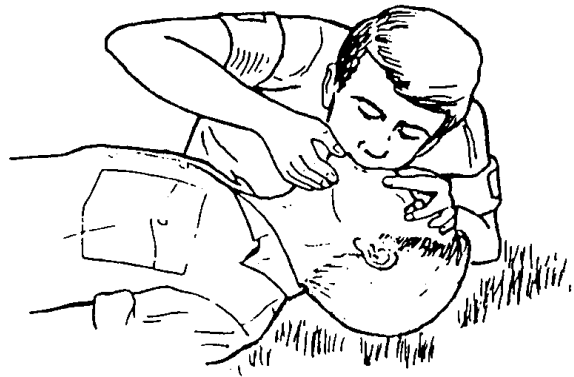


Figure 3-4. Administering mouth-to-mouth resuscitation.

(5) Break the seal over the casualty's mouth and release his nose. This will allow the casualty's body to exhale.

**CAUTION:** If you cannot seal off the casualty's nose or if the casualty has injuries to his mouth or jaw area that prevent you from administering mouth-to-mouth resuscitation, administer mouth-to-nose resuscitation instead. Close the casualty's mouth so air will not escape, seal your mouth over the casualty's nose, and blow the two breaths (ventilations) into his nostrils. Rates for mouth-to-nose respiration are the same as for mouth-to-mouth respirations.

**c. Evaluate Effectiveness of the Ventilations.**

(1) If the casualty begins breathing again on his own, look for injuries.

(2) If air goes in and out of the casualty's lungs (chest rises and falls) but he does not start breathing on his own, check his pulse.

(3) If the casualty's chest did not rise and fall, then air is not getting into his lungs.

(a) Try to open the casualty's airway more (lift the chin more and/or increase the tilt of the head) and administer two full breaths again.

(b) If the casualty's chest still does not rise, a foreign object is probably blocking his airway. Remove any visible blockage. Administer manual thrusts (see Section II of this lesson) as needed to expel any blockage. Once the airway is unblocked and the obstruction removed, administer two full breaths again and reevaluate.

d. **Check the Casualty's Pulse.** If the casualty's airway is open (two full breaths delivered successfully), check for a pulse. A pulse indicates that the heart is still pumping blood.

(1) Continue to maintain the casualty's airway. If the head-tilt/chin-lift method is being used, keep one hand pressing on the casualty's forehead.

(2) Locate the carotid artery on the side of the casualty's neck that is closest to you. One carotid artery is located in the groove on the left side of the trachea (windpipe) next to the casualty's larynx (Adam's apple). The other carotid artery is located in the groove on the right side of the trachea next to the casualty's larynx.

(3) Once the artery is located, gently press on the artery with your middle and index fingers and feel for a pulse for 5 to 10 seconds (figure 3-5). Also look for signs of spontaneous breathing (rising and falling of the casualty's chest, etc.) while checking the pulse.

**CAUTION:** Do not use your thumb to feel for the casualty's pulse. If you use your thumb, you may mistake the pulse in your thumb for the casualty's pulse.

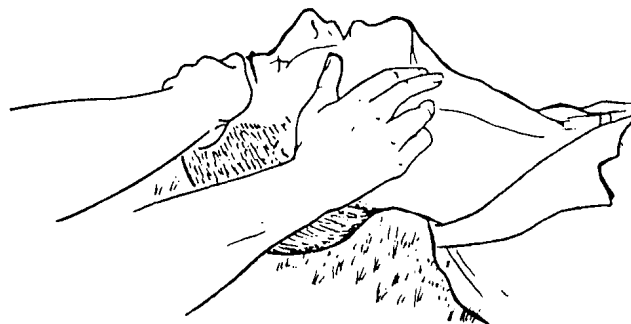


Figure 3-5. Feeling for a carotid pulse.

(4) Evaluate the situation and perform needed actions.

(a) If the casualty resumes breathing on his own, check for injuries. Continue to monitor the casualty's breathing and be prepared to resume administering mouth-to-mouth resuscitation if needed.

(b) If the casualty has a pulse but is not breathing on his own, continue mouth-to-mouth resuscitation (paragraph e below).

(c) If the casualty has no pulse, administer cardiopulmonary resuscitation (CPR) (see Section III) if the combat situation allows and send a soldier to find medical help.

**NOTE:** In a tactical situation, if a casualty is found with no pulse and no respiration, CPR is not recommended.

**e. Continue Mouth-to-Mouth Resuscitation.** If the casualty has an unobstructed airway, a pulse, and is not breathing on his own, continue to administer mouth-to-mouth resuscitation.

(1) Open the casualty's airway.

(2) Take a deep breath.

(3) Close the casualty's nostrils.

(4) Seal your mouth over the casualty's mouth.

(5) Blow the breath into the casualty's lungs. Observe the rising of the casualty's chest to ensure that the ventilation is effective.

(6) Break your seal over the casualty's mouth and release his nose. This will allow the casualty to exhale on his own.

(7) Repeat ventilations at the rate of one ventilation (breath) every 5 seconds).

(8) After about one minute, stop ventilations and check the carotid pulse again. Observe for spontaneous breathing (chest rising and falling) as you feel for the pulse. The procedure should take 3 to 5 seconds.

(a) If the casualty resumes breathing on his own, check for injuries.

(b) If the casualty has a pulse but is not breathing on his own, continue administering mouth-to-mouth resuscitation. Continue to check his pulse and check for resumed spontaneous breathing every minute or so.

(c) If no pulse is found, perform CPR if the combat situation allows and send a soldier to seek medical help.

(9) Continue administering mouth-to-mouth resuscitation and pulse checks until:

- (a) The casualty begins breathing on his own.
- (b) You are relieved by a qualified person, such as the combat medic.
- (c) You must seek medical help (no pulse).
- (d) You must continue with your combat duties.
- (e) You are too exhausted to continue.

### **3-7. INSERTING A NASOPHARYNGEAL AIRWAY**

A nasopharyngeal airway (see figure 3-6) provides an open (patent) airway and helps to keep the tongue from falling to the back of the mouth and blocking the airway. Instructions for inserting a nasopharyngeal airway are given below.

**CAUTION:** Do not use the nasopharyngeal airway if the roof of the casualty's mouth is fractured or brain matter is exposed.

**CAUTION:** Do not use the nasopharyngeal airway if there is clear fluid (cerebrospinal fluid [CSF]) coming from the ears or nose. This may indicate a skull fracture.

- a. Place the casualty on his back with his face up (see paragraph 2-5).
- b. Lubricate the tube with water or sterile lubricating jelly (figure 3-7).
- c. Insert the airway.
  - (1) Expose the opening of the casualty's nostril (figure 3-8).

**NOTE:** The casualty's right nostril is usually used.

- (2) Insert the tip of the airway tube into the nostril.
- (3) Position the tube so that the bevel (pointed end) of the airway faces toward the septum (the partition inside the nose that separates the nostrils).
- (4) Insert the airway into the nostril and advance it until the flange rests against the nostril (figures 3-9 and 3-10).



Figure 3-6. Example of a nasopharyngeal airway and package.



Figure 3-7. Lubricating the nasopharyngeal airway tube with sterile lubricating jelly.





Figure 3-8. Exposing the opening of the casualty's nostril.

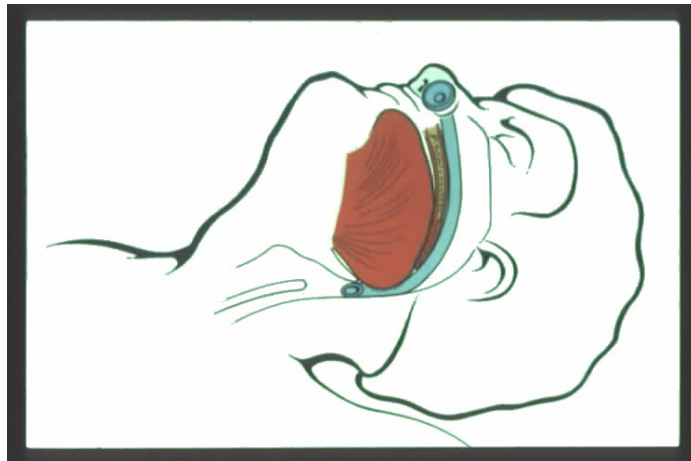


Figure 3-9. Cut-away showing nasopharyngeal airway keeping the tongue from blocking the trachea (windpipe).



Figure 3-10. Airway inserted with flange resting against the nostril.

**CAUTION:** Never force the airway into the casualty's nostril. If resistance is met, pull the tube out and attempt to insert it in the other nostril. If neither nostril will accommodate the airway, go to step d.

- d. Place the casualty in the recovery position (paragraph 3-8).
- e. Send a soldier to seek medical aid or seek medical aid for the casualty yourself.

### **3-8. PLACING THE CASUALTY IN A RECOVERY POSITION**

The recovery position (figure 3-11) allows blood and mucus to drain out of the casualty's nose and mouth and not to drain back into the airway. To place a casualty in the recovery position:

- a. Roll the casualty as a single unit onto his side.
- b. Place the hand of the casualty's lower arm under his chin.
- c. Flex the casualty's upper leg.

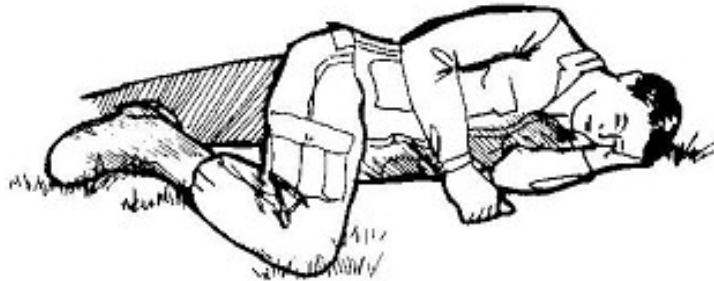


Figure 3-11. Casualty in the recovery position.

### **3-9. MONITORING THE CASUALTY'S BREATHING**

Continue to monitor the casualty's breathing.

- a. If the casualty does not have a nasopharyngeal airway inserted and his breathing rate falls below two breaths every 15 seconds, insert a nasopharyngeal airway.
- b. If tension pneumothorax develops, perform a needle chest decompression (Lesson 4).
- c. If needed, prepare the casualty for evacuation (Lesson 7).

## Section II. REMOVING AN OBSTRUCTION FROM A PERSON'S AIRWAY

**NOTE:** This material is placed in a separate section because it will seldom be used on the battlefield. Although the manual thrusts may be used to remove airway blockage in an unconscious casualty, they are normally used in a non-combat setting.

### 3-10. INTRODUCTION

a. An upper airway obstruction (blockage) occurs when an object enters a person's trachea (windpipe) and obstructs airflow. The blockage can be caused by food, blood clots or loose teeth resulting from a head injury, vomitus (regurgitated stomach contents) which has been inhaled, or objects such as buttons. The blockage must be expelled or removed and breathing restored. A blockage that stops breathing or greatly reduces the amount of air that can be inhaled and exhaled can quickly lead to unconsciousness and death.

b. A person with an airway obstruction will automatically begin to cough or at least try to cough. In addition, he will probably clutch his throat. This clutching action is natural, but it has also been adopted as the universal distress signal for choking figure 3-12). This sign alerts other people that the problem is an airway obstruction rather than another problem such as a heart attack.



Figure 3-12. Universal distress signal for choking

### 3-11. EVALUATING THE BLOCKAGE

a. **Partial Blockage With Good Air Exchange.** If the person can speak or cough forcefully, he has a partial blockage with good air exchange. (A partial blockage means that the airway is not completely blocked and air can still get to and from the person's lungs. Good air exchange indicates that the person can still inhale and exhale enough air to carry on all life processes.) A person may have good air exchange even though he makes a high-pitched sound between coughs. Encourage a person with good air exchange to keep coughing until the obstruction is coughed up. Do not interfere with his efforts. Do not leave the person since "good" air exchange can rapidly deteriorate to "poor" air exchange or complete blockage, either of which can result in unconsciousness and death. Be prepared to administer manual thrusts should his condition worsen.

b. **Partial Blockage With Poor Air Exchange.** If the person has a weak cough, makes high-pitched noises (like crowing) while inhaling, or has a bluish tint around his lips and fingernail beds, he has a partial blockage with poor air exchange. A person with poor air exchange is not inhaling enough air to continue carrying on all life processes. If the person is not helped, he will become unconscious and die. If a person has poor air exchange, call for help and begin administering manual thrusts. If possible, send someone to seek medical help.

**CAUTION:** If you cannot decide whether a conscious person has good or poor air exchange, tell him to speak to you. If he does not speak, assume he has an obstructed airway.

c. **Complete Blockage.** If the person's airway is completely blocked, he can neither inhale nor exhale (no air exchange occurring). This means he cannot speak at all. Quick action is needed to clear the airway. Call for help and begin administering manual thrusts. If possible, send someone to seek medical help.

**CAUTION:** Do not slap a choking person on his back. Blows to his back may cause the object to go down the airway instead of out of the airway.

**NOTE:** A manual thrust acts like an artificial cough. Each thrust is performed with the intent of dislodging the obstruction without having to perform additional thrusts.

### 3-12. ADMINISTERING ABDOMINAL THRUSTS TO A CONSCIOUS PERSON

**NOTE:** This procedure can be performed on a person who is standing or sitting.

**CAUTION:** If the person has significant abdominal injuries, is noticeably pregnant, or has a waist that is too large to encircle, administer chest thrusts instead of abdominal thrusts.

- a. Stand behind the person, insert your arms under his arms, and wrap your arms around his waist.
- b. Make a fist with one hand and place the thumb side of your fist on the midline of the person's abdomen slightly above his navel (belt buckle) and well below the bottom tip of his breastbone (xyphoid process).
- c. Grasp your fist with your other hand.
- d. Press your fists into the person's abdomen using a quick inward and upward motion (figure 3-13), then relax the hold.
- e. Continue administering abdominal thrusts at a rate of one thrust every 4 or 5 seconds until the obstruction is expelled or the person becomes unconscious. Each thrust should be a separate and distinct movement delivered with the intent of dislodging and expelling the object causing the blockage.
- f. If the person loses consciousness before the object is expelled, call for help again, move backward, and lower the person onto the ground so that he is in a supine (on his back) position.



Figure 3-13. Administering an abdominal thrust to a standing person.

### 3-13. ADMINISTER CHEST THRUSTS TO A CONSCIOUS PERSON

- a. Stand behind the person, place your arms under his armpits, and encircle his chest.
- b. Make a fist with one hand and place the thumb side of the fist on the middle of the person's breastbone (sternum).

#### WARNING

A thrust delivered directly to the ribs or to the bottom of the sternum can fracture the ribs or the xiphoid process (a small bone at the bottom of the sternum) which could puncture internal organs such as the lungs and heart.

- c. Cover your fist with your other hand.
- d. Thrust inward (figure 3-14) so the sternum is depressed about 1 1/2 to 2 inches, then relax the hold.



Figure 3-14. Administering a chest thrust to a standing person.

e. Continue administering chest thrusts at a rate of one thrust every 4 or 5 seconds until the obstruction is expelled or the person becomes unconscious. Each thrust should be a separate and distinct movement delivered with the intent of dislodging and expelling the object causing the blockage.

f. If the casualty loses consciousness before the object is expelled, call for help again, move backward, and lower the casualty onto the ground so that he is in a supine (on his back) position.

### **3-14. PREPARING TO ADMINISTER THRUSTS TO AN UNCONSCIOUS PERSON**

a. Position the person so that he is lying flat on his back on a solid surface (for example, the ground rather than on a mattress.)

b. Open the person's mouth by grasping the lower teeth, and using the thumb and index finger to lift the jaw open.

c. Look into the mouth and perform a finger sweep to locate and remove any loose obstruction. Do this by inserting the index finger of your hand along the inside of one cheek. Using a hooking motion, move your finger from the far side of the mouth to the near side.

d. Open the person's airway and administer two breaths using the procedures given in paragraphs 3-4 and 3-6. If the attempt fails, reposition the head to further open the airway and try again.

(1) If you see the chest rise and fall, check the person's pulse. If the person has a pulse, perform mouth-to-mouth rescue breathing. If there is no pulse, perform cardiopulmonary resuscitation.

(2) If the attempts at ventilation fail, perform abdominal or chest thrusts for an unconscious person. If the person has significant abdominal injuries, is noticeably pregnant, or is extremely overweight, administer chest thrusts. Otherwise, administer abdominal thrusts.

### **3-15. ADMINISTERING ABDOMINAL THRUSTS TO AN UNCONSCIOUS PERSON**

a. Kneel astride the person's thighs.

b. Place the heel of one hand on the midline of the person's abdomen slightly above the navel (belt buckle) and well below the tip of the breastbone (xiphoid process) with the fingers pointing toward the person's head (figure 3-15). Do not make your hand into a fist.



Figure 3-15. Administering an abdominal thrust to an unconscious person.

- c. Place your other hand on top of the first hand.
  - d. Press into the abdomen using a quick forward (inward) and upward thrust. The thrust can be delivered by locking your elbows and shifting your body weight forward.
  - e. Release the pressure on the person's abdomen (shift your body weight backward).
- (1) If you think the obstruction has been dislodged, perform a finger sweep and administer two full breaths. If the airway is open, check for a pulse and for spontaneous breathing (person breathing on his own).
- (2) If the obstruction was not dislodged, administer another abdominal thrust. If you administer five abdominal thrusts without dislodging the obstruction, call for help again, perform a finger sweep, and try to administer two breaths. Repeat the cycle of five abdominal thrusts, finger sweep, and breaths until the object is expelled and the person's airway is open (chest rises during ventilations).

**CAUTION:** If the person vomits, turn him onto his side and use a quick finger sweep to remove vomitus from his mouth.

### 3-16. ADMINISTERING CHEST THRUSTS TO AN UNCONSCIOUS PERSON

- a. Kneel close beside the person's chest.
- b. Locate the lower edge of the person's rib cage (figure 3-16 A).
- c. Run the fingers of your hand nearest the person's feet along the lower edge of the rib cage until you come to the notch where the rib meets the breastbone.



d. Place your middle finger (same hand) on the notch with your index finger just above it. Your index finger will be resting on the lower end of the breastbone (figure 3-16 B).

e. Place the heel of your other hand on the lower half of the breastbone next to and above (toward the person's head) your two fingers (figure 3-16 C). Do not form a fist. The heel of this hand is on the compression site (lower half of the sternum and above the xiphoid process). Using this compression site avoids pressing on the tip of the breastbone, which could result in further injury.

**CAUTION:** Make sure the heel of your hand is on the breastbone and is not resting on the ribs.

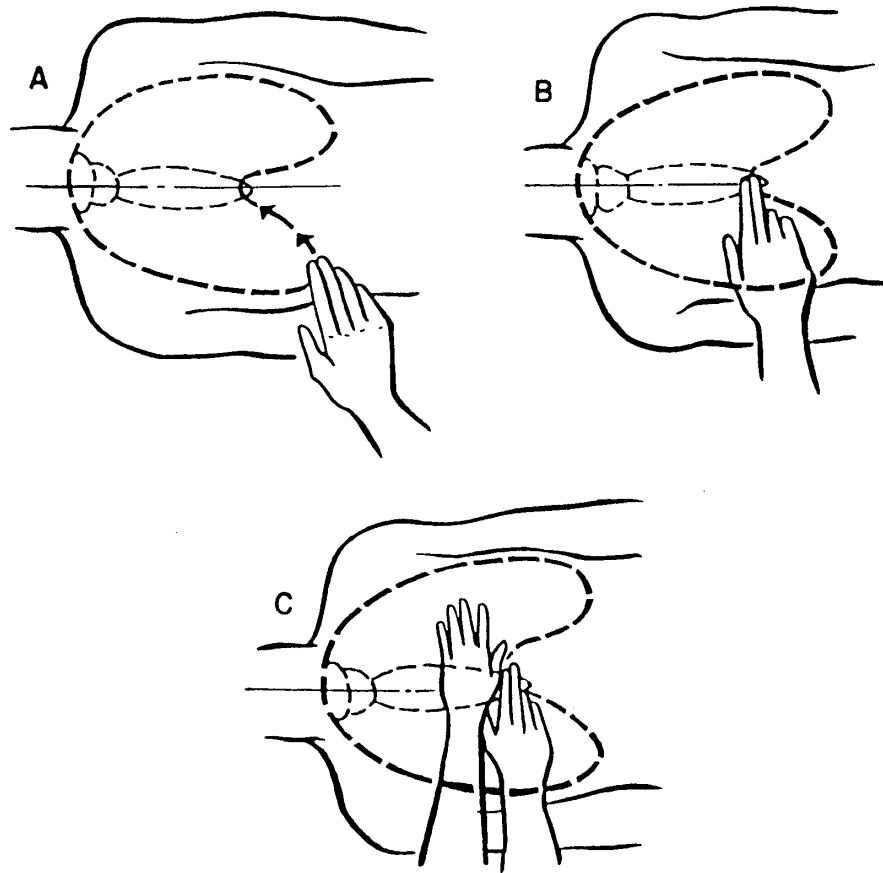


Figure 3-16. Locating the compression site for chest thrusts.

f. Remove your fingers from the notch area and place that hand on top of the hand on the compression site. Either extend or interlace your fingers.

g. Straighten your arms and lock your elbows. Position your shoulders directly above your hands.

h. Without bending your elbows, rocking, or allowing your shoulders to sag, apply enough pressure straight down to depress the person's breastbone  $1\frac{1}{2}$  to 2 inches (figure 3-17).



Figure 3-17. Administering a chest thrust to an unconscious person.

i. Release the pressure on the person's chest (shift your body weight backward).

(1) If you think the obstruction has been dislodged, perform a finger sweep and administer two full breaths. If the airway is open, check for a pulse and for spontaneous breathing (person breathing on his own).

(2) If the obstruction was not dislodged, administer another chest thrust. If you administer five chest thrusts without dislodging the obstruction, call for help again, perform a finger sweep, and try to administer two breaths. Repeat the cycle of five chest thrusts, finger sweep, and breaths until the object is expelled and the person's airway is open (chest rises during ventilations).

**CAUTION:** If the person vomits, turn him onto his side and use a quick finger sweep to remove vomitus from his mouth.

## Section III. PERFORMING CARDIOPULMONARY RESUSCITATION

### 3-17. CARDIOPULMONARY RESUSCITATION

Cardiopulmonary resuscitation (CPR) allows the rescuer to cause the person's heart to pump blood and his lungs to process oxygen. Cardiopulmonary resuscitation is seldom used in combat. It is primarily used in everyday life when a person has a heart attack and falls unconscious.

### 3-18. PRELIMINARY MEASURES

The following are performed when you find a person before beginning CPR. If you have already performed these measures (previous sections), do not repeat them.

a. **Check for Responsiveness.** Ask in a loud, but calm voice, "Are you okay?" Gently shake or tap the person on the shoulder. If the person does not respond, position the person on his back and send someone to get medical help.

b. **Open the Airway.** Open the person's airway using the head-tilt/chin-lift or the jaw thrust, as appropriate. If a spinal injury is suspected, use the jaw-thrust method.

c. **Check for Breathing.** Place your ear an inch above the person's mouth and look, listen, and feel for breathing.

d. **Administer Two Full Breaths.** If the person is not breathing, administer two full ventilations. If the ventilations are not successful (chest does not rise and fall), reposition the person's head to increase the airway and administer two more breaths. If the second attempt fails, perform abdominal or chest thrusts to remove the blockage.

e. **Check Pulse.** Once the airway is open and breaths have been administered, check the person's pulse. If there is a pulse, continue rescue breathing efforts. If there is no pulse, perform cardiopulmonary resuscitation.

### 3-19. CARDIOPULMONARY RESUSCITATION

Once you have determined that the person has no pulse, CPR is required.

a. **Perform Chest Compressions.**

(1) Place the person on a hard, flat surface.

(2) Locate the compression site using the same methods as locating the compression site for chest thrusts on an unconscious person.

(3) Perform a CPR compression using the same procedures as for delivering a chest thrust to an unconscious person.

(4) Administer 15 compressions in 9 to 11 seconds (a rate of about 100 per minute).

**NOTE:** Do not remove the heel of your hand from the person's chest or reposition your hand between compressions.

b. **Perform Ventilations.** Open the person's airway and administer two full breaths. (1.5 to 2 seconds each).

c. **Repeat Compressions-Ventilations Cycle.** Repeat steps a and b for a total of four complete cycles.

d. **Check the Pulse.** After four cycles (about one minute), check the person's carotid pulse for 3 to 5 seconds.

(1) If a pulse is present, perform rescue breathing.

(2) If a pulse is not present, continue to perform CPR. Continue performing cycles consisting of 15 compressions and 2 ventilations at a rate of four cycles per minute (60 compressions, 8 breaths per minute). Recheck the person's pulse every 3 to 5 minutes. Continue performing CPR until the person's pulse returns, you are relieved by a qualified person, you are told to stop by a physician or a superior, or you are too tired to continue.

## LESSON EXERCISES: LESSON 3

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. You find a soldier who appears to be unconscious. Which of the following should be your first action in rendering aid to this person?
  - a. Check his pulse.
  - b. Call out "Are you okay?" and gently shake his shoulder.
  - c. Begin inserting a nasopharyngeal airway.
  - d. Open his airway.
  - e. Begin performing mouth-to-mouth resuscitation.
  
2. You are going to check the casualty to see if he is breathing. How should you position the casualty?
  - a. On his back.
  - b. On his stomach.
  - c. On his right side.
  - d. On his left side.
  
3. Which method of opening the airway is preferred if you believe that the casualty has an injured neck or spine?
  - a. Head-tilt/chin-lift.
  - b. Jaw thrust.

4. In the head-tilt/chin-lift method of opening a casualty's airway, one hand is used to press on his forehead. How is the thumb on the opposite hand used?
  - a. Lift the casualty's chin by hooking the thumb under the casualty's jaw.
  - b. Hook over the casualty's bottom teeth to ensure a good grip on his chin.
  - c. Press against the casualty's nose to seal off his nostrils.
  - d. Keep the casualty's lower lip depressed, if needed.
  
5. When performing the head-tilt/chin-lift method of opening a casualty's airway, you \_\_\_\_\_ allow your fingers to press deeply in the soft tissues under the chin.
  - a. Should.
  - b. Should not.
  
6. When performing a jaw thrust on a casualty lying on the ground, your elbows should be resting on the:
  - a. Casualty's chest.
  - b. Casualty's abdomen.
  - c. Ground.
  
7. When turning a casualty, one of your hands is used to support the casualty's head and neck. What should you do with the other hand.
  - a. Reach across the casualty's chest, grab under the casualty's arm, and pull the casualty toward you.
  - b. Place your hand under the casualty's side that is nearest to you and push the casualty away from you.

8. When you check for breathing, you should:
- a. Watch the casualty's chest to see if it rises and falls.
  - b. Listen for sounds of breathing.
  - c. Feel for any exhaled breath blowing against your face.
  - d. All of the above.

9. What are three indicators that a nasopharyngeal airway should be inserted?

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10. What should you do with the nasopharyngeal tube before inserting it into the casualty's nostril?

- a. Lubricate the outside of the tube with antibacterial ointment.
- b. Rub the outside of the tube with an iodine solution.
- c. Pour alcohol through the inside of the tube.
- d. Lubricate the outside of the tube with water or sterile lubricating jelly.
- e. None of the above; the tube is inserted as is.

11. Normally, the nasopharyngeal tube is inserted into the casualty's \_\_\_\_\_ nostril.

- a. Left.
- b. Right.

12. You are inserting a nasopharyngeal tube into the casualty's nostril when resistance is met. What should you do?
- a. Continue inserting the tube.
  - b. Begin twisting the tube so that it slides around the blockage.
  - c. Remove the tube and insert it into the nostril again.
  - d. Remove the tube and insert it into the other nostril.
  - e. Remove the tube and begin cardiopulmonary resuscitation.
13. Upon successfully inserting a nasopharyngeal airway, the flange of the airway should be:
- a. Inserted as far as possible into the casualty's nostril.
  - b. Against the outer part of the casualty's nostril.
  - c. About half an inch from the outside of the casualty's nostril.
  - d. About an inch from the outside of the casualty's nostril.
14. You have inserted a nasopharyngeal airway. How should you position the casualty?
- a. On his back.
  - b. On his stomach.
  - c. On his side.
15. You are going to perform mouth-to-mouth rescue breathing while maintaining an open airway using the head-tilt/chin-lift. You should seal the casualty's nostrils by

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16. You are beginning to administer rescue breathing. You should begin by:
  - a. Administering one full breath.
  - b. Administering two full breaths.
  - c. Administering five full breaths.
  - d. Administering 15 quick breaths.
  
17. After administering the initial ventilation(s) in rescue breathing and determining that the chest rises and falls, you should:
  - a. Begin CPR.
  - b. Continue administering ventilations.
  - c. Check for a pulse.
  - d. Go to seek medical help.
  
18. Once rescue breathing has been initiated, ventilations should be administered at a rate of :
  - a. One breath every 5 seconds.
  - b. Two breaths every 3-4 seconds.
  - c. Five breaths every minute.
  - d. Fifteen breaths every 9-10 seconds.
  
19. You are administering cardiopulmonary resuscitation to a casualty on the battlefield. Your squad leader tells you that you must move out and to stop performing CPR. You feel that you can still continue your CPR efforts. What should you do?
  - a. Continue administering CPR.
  - b. Ask your squad leader to obtain a medical opinion from a physician.
  - c. Follow you squad leader's instructions.

20. You walk into a room. The only other person in the room has a scared look on his face. He quickly places his hand around the front part of his throat, but does not say anything. What is probably happening?
- a. The person is feeling faint.
  - b. The person is having a heart attack.
  - c. The person is choking.
  - d. The person is in shock.
21. Before giving manual thrusts to a choking person, you should:
- a. Determine if the person has good, poor, or no air exchange.
  - b. Check the person's pulse.
  - c. Slap the person on his back.
  - d. Have the person lie down and elevate his feet.
22. If the person with an obstruction can speak or cough forcefully, you should:
- a. Begin administering manual thrusts.
  - b. Begin slapping the person on the back.
  - c. Have the person lie down before he becomes unconscious.
  - d. Encourage the person to keep coughing.
23. You are going to administer manual thrusts to a person who is choking. When is the chest thrust used rather than the abdominal thrust?

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24. An abdominal thrust is delivered using a:
- Quick inward and downward motion.
  - Slow inward and downward motion.
  - Quick inward and upward motion.
  - Slow inward and upward motion.
25. When performing an abdominal thrust, your fist should be \_\_\_\_\_  
\_\_\_\_\_.
26. When performing a chest thrust to a person who is standing, your fist should be \_\_\_\_\_.
27. When trying to dislodge an object from a standing person's airway, manual thrusts should be delivered every \_\_\_\_\_ to \_\_\_\_\_ seconds until the object is expelled or the casualty \_\_\_\_\_.
28. When trying to expel an airway obstruction in an unconscious person using chest thrust, the person's sternum should be depressed about \_\_\_\_\_.
29. Before performing CPR on a person, you should make sure:
- The person does not have a pulse.
  - The person is not breathing on his own.
  - The person's airway is open.
  - a and b above.
  - a, b, and c above.

30. When performing chest compressions during CPR, the compression site should be: \_\_\_\_\_.
31. When performing chest compressions during CPR the person's sternum should be depressed about \_\_\_\_\_ inches.
32. While performing CPR, you should administer \_\_\_\_\_ compression(s) followed by \_\_\_\_\_ ventilations. These cycles are performed at the rate of \_\_\_\_\_ cycle(s) per minute.
33. If possible, form a group of three. One person plays the role of the casualty, the second plays the role of the rescuer, and the third plays the role of the evaluator (the evaluator uses this lesson as a guide). Practice the following:
- Turning the casualty from his front onto his back
  - Performing the head-tilt/chin-lift.
  - Performing the jaw thrust.
34. If you have access to an appropriate manikin, practice inserting the following:
- Performing rescue breathing.
  - Performing abdominal thrusts (standing casualty).
  - Performing cardiopulmonary resuscitation.
35. If you have access to an appropriate manikin and a nasopharyngeal airway, practice inserting the airway.

### SOLUTIONS TO LESSON EXERCISES: LESSON 3

1. b (para 3-2)
2. a (para 3-3)
3. b (para 3-4)
4. d (para 3-4a(4))
5. b (para 3-4a(4) Second caution)
6. c (para 3-4b(2))
7. a (paras 3-3; 2-5e, f, g)
8. d (paras 3-5a, b, c)
9. Casualty is unconscious  
Casualty's respiration rate is less than 2 breaths every 15 seconds.  
Casualty is making snoring or gurgling sounds.  
(para 3-5d(2))
10. d (para 3-7b)
11. b (para 3-7c(1) Note)
12. d (para 3-7c(4) Caution)
13. b (para 3-7c(4))
14. c (paras 3-5d(2), 3-7d, 3-8a)
15. Pinching the nostrils with the thumb and index finger of the hand exerting pressure to the casualty's forehead. (para 3-6a(1)).
16. b (para 3-6b)
17. c (para 3-6d)
18. a (para 3-6e(7))
19. c (para 3-19d(2))
20. c (para 3-10b, fig 3-12)

21. a (paras 3-11a, b, c)
22. d (para 3-11a)
23. The person has significant abdominal injuries.  
The person is noticeably pregnant.  
The person's waist that is too large to encircle with your arms.  
(para 3-12 Caution)
24. c (para 3-12d)
25. Slightly above the person's navel. (paras 3-12b, 3-15b)
26. Over the middle of the person's breastbone (sternum) (para 3-13b)
27. 4 to 5 second; loses consciousness. (paras 3-12e, 3-13e)
28. One and a half to two inches. (para 3-16h)
29. e (paras 3-18b, c, d, e)
30. On the lower half of sternum and above the xyphoid process.  
(paras 3-19a(2), 3-16e)
31. One and a half to two. (paras 3-19a(3), 3-16h)
32. 15 (compressions), 2 (ventilations), 4 (cycles per minute) (paras 3-19d, d(2))
33. See the following checklists.
34. See the following checklists.
35. See the last checklist.

### CHECK AND TURN A CASUALTY

**Given:** Simulated unconscious casualty lying on his stomach

	GO	NO-GO
1. Checks the casualty for responsiveness (shakes or taps shoulder, asks "Are you OK?").	_____	_____
2. Kneels beside the casualty.	_____	_____
3. Raises the casualty's near arm above his head.	_____	_____
4. Straightens the casualty's legs.	_____	_____
5. Supports the casualty's head and neck with one hand.	_____	_____
6. Reaches across casualty with free hand, grabs casualty, and rolls casualty toward him in a steady and even manner.	_____	_____
7. Places the casualty's arms at his side.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO

### PERFORM A HEAD-TILT/CHIN LIFT

**Given:** Simulated unconscious casualty lying on his back with arms at his sides

	GO	NO-GO
1. Kneels at the casualty's shoulder.	_____	_____
2. Places one hand on the casualty's forehead and applies firm pressure with the palm to tilt the head back.	_____	_____
3. Places fingertips of other hand under the casualty's chin and lifts the lower jaw forward.	_____	_____
4. Pressure from fingers do not interfere with casualty's airway.	_____	_____
5. Casualty's upper and lower teeth are almost brought together, but the casualty's mouth is not closed. (The thumb on the hand performing the chin lift can be used to depress the casualty's lower lip if needed.)	_____	_____
6. Checks casualty for breathing (looks for rising/falling chest, listens and feels for air flow).	_____	_____

#### OVERALL EVALUATION

(A no-go on any step will result in a no-go for the entire task)

GO NO-GO



### PERFORM A JAW THRUST

**Given:** Simulated unconscious casualty lying on his back with arms at his sides

	GO	NO-GO
1. Kneels at the top of the casualty's head.	_____	_____
2. Rests elbows on surface (ground, etc.).	_____	_____
3. Places one hand on each side of casualty's head and stabilizes the casualty's head with his forearms.	_____	_____
4. Places hands at the angles of the casualty's lower jaw.	_____	_____
5. Pushes the angles of the lower jaw forward using his index fingers.	_____	_____
6. Casualty's upper and lower teeth are almost brought together, but the casualty's mouth is not closed. (The thumb on the hand performing the chin lift can be used to depress the casualty's lower lip if needed.)	_____	_____
7. Checks casualty for breathing (looks for rising/falling chest, listens and feels for air flow).	_____	_____

#### OVERALL EVALUATION

(A no-go on any step will result in a no-go for the entire task)

GO NO-GO

### PERFORM RESCUE BREATHING

**Given:** Simulated unconscious casualty lying on his back with arms at his sides

	GO	NO-GO
1. Opens the casualty's airway.	_____	_____
2. Closes the casualty's nostrils.	_____	_____
3. Administers two full breaths. (Forms seal with mouth when performing ventilations; ventilations completed in 3-4 seconds.)	_____	_____
4. If ventilations were not successful, opens casualty's airway more and tries again.	_____	_____
5. Checks casualty's carotid pulse (artery on side of neck next to Adam's apple) for 5-10 seconds.	_____	_____
6. Continues administering breaths at the rate of one ventilation every 5 seconds.	_____	_____
7. Stops administering ventilations to check pulse about every minute.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO

### ADMINISTER ABDOMINAL THRUSTS TO A STANDING PERSON

**Given:** Conscious standing person with simulated airway obstruction.

		GO	NO-GO
1.	Verifies the person has poor or no air exchange (casualty cannot speak, etc.).	_____	_____
2.	Stands behind person and wraps arms around the person's waist. Person's arms are not trapped inside rescuer's arms.	_____	_____
3.	Makes a fist and places it slightly above the person's navel with the thumb side toward the person.	_____	_____
4.	Covers the fist with the other hand.	_____	_____
5.	Presses fist into abdomen with a quick inward, upward motion.	_____	_____
6.	Continues administering abdominal thrusts at a rate of about one thrust every 4-5 seconds until the blockage is expelled or the casualty becomes unconscious.	_____	_____
	<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO

## ADMINISTER CARDIOPULMONARY RESUSCITATION

**Given:** Simulated unconscious casualty with no respiration and no pulse lying on his back on the ground with arms at his sides.

	GO	NO-GO
1. Kneels close to the casualty's chest.	_____	_____
2. Locates the compression site (runs middle finger along lower edge of rib cage to the notch at breastbone, places index finger above middle finger, places heel of other hand next to the index finger) on lower half of breastbone.	_____	_____
3. Removes first hand and places it on top of hand at compression site.	_____	_____
4. Extends or interlaces fingers of both hands.	_____	_____
5. Straightens arms, locks elbows, and positions shoulders directly above hands (compression site).	_____	_____
6. Presses straight down to depress the breastbone 1.5 to 2 inches. Elbows did not bend, shoulders did not sag, and casualty did not rock.		
7. Releases pressure to allow breastbone to rise.		
8. Performs a total of 15 chest compressions in 9-11 seconds without removing heel of hand from compression site.		
9. Opens the casualty's airway using head-tilt/chin-lift or jaw thrust, as appropriate.		
10. Administers two quick full breaths (3-4 seconds)		
11. Repeats 15 compressions-2 breaths cycle for a total of four cycles (about one minute)		
12. Checks carotid pulse for 3-5 seconds.	_____	_____
13. If no pulse, continues 15 compressions-2 breaths cycles, rechecking the pulse every 3-5 minutes.	_____	_____

OVERALL EVALUATION

(A no-go on any step will result in a no-go for the entire task)

GO NO-GO

### INSERT A NASOPHARYNGEAL AIRWAY

**Given:** Simulated unconscious casualty lying on his back with arms at his sides  
Nasopharyngeal airway (from combat lifesaver MES)  
Packet of sterile lubricating jelly (from combat lifesaver MES)

	GO	NO-GO
1. Positions casualty in a face up position.	_____	_____
2. Lubricates the tube with provided jelly.	_____	_____
3. Exposes the opening of the casualty's right nostril.	_____	_____
4. Inserts the tip of the airway into the nostril with the bevel toward the septum.	_____	_____
5. Advances airway until the flange rests against the nostril.	_____	_____
6. Does not force the airway into the nostril. If resistance is met, pulls out the tube and attempts to insert it in the other nostril.	_____	_____
7. Places the casualty in the recovery position (on his side with hand under his chin and upper leg flexed to stabilize the casualty).	_____	_____

#### OVERALL EVALUATION

(A no-go on any step will result in a no-go for the entire task)

GO NO-GO



## LESSON ASSIGNMENT

### LESSON 4

Treating Penetrating Chest Trauma and  
Decompressing Tension Pneumothorax.

### LESSON ASSIGNMENT

Paragraphs 4-1 through 4-9.

### LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 4-1. Identify the possible effects of an open chest wound.
- 4-2. Identify the signs and symptoms of an open chest wound.
- 4-3. Identify the procedures for sealing an open chest wound.
- 4-4. Identify the possible effects of a tension pneumothorax.
- 4-5. Identify the signs and symptoms of tension pneumothorax.
- 4-6. Identify the procedures for performing needle chest decompression.

### REFERENCES

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
Training Support Package 071-D-2317 / First Aid 2  
(Manage the Airway)

### SUGGESTION

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 4

### TREATING PENETRATING CHEST TRAUMA AND DECOMPRESSING TENSION PNEUMOTHORAX

#### Section I. TREATING AN OPEN CHEST WOUND

##### 4-1. INTRODUCTION

The body has two lungs. Each lung is enclosed in a separate airtight area within the chest. If an object punctures the chest wall and allows air to get into one of these areas, the lung within that area begins to collapse. In order for both lungs to collapse, both sides of the chest would have to be punctured. Any degree of collapse, however, interferes with the casualty's ability to breathe and reduces the amount of oxygen available for the body to use. Figure 4-1 shows a normal chest and lungs. Figure 4-2 shows a chest and lungs with a penetrating (open) chest wound that has allowed one of the lungs to collapse.

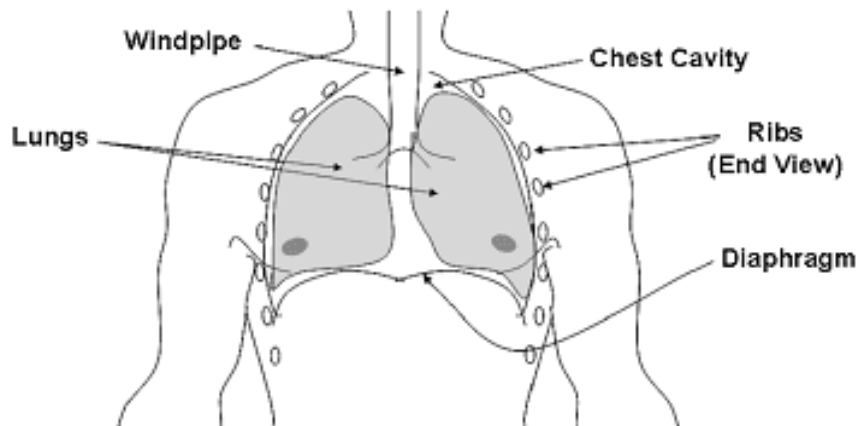


Figure 4-1. Normal chest cavity and lungs.

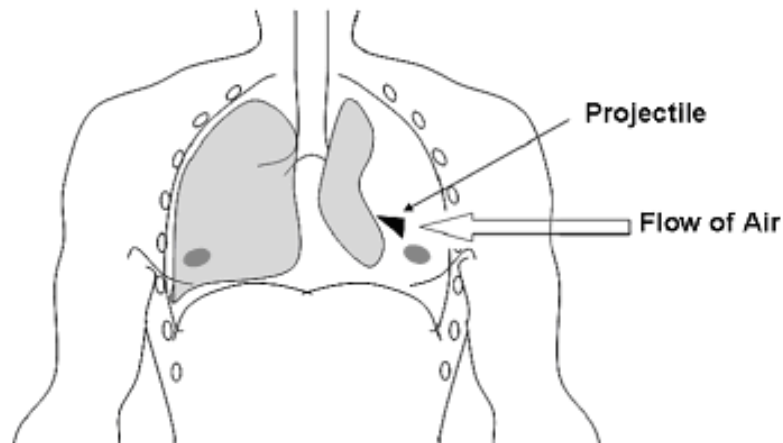


Figure 4-2. Collapsed lung.



## **4-2. SIGNS AND SYMPTOMS OF AN OPEN CHEST WOUND**

An open chest wound can be caused by the chest wall being penetrated by a bullet, knife blade, shrapnel, or other object. If you are not sure if the wound has penetrated the chest wall completely, treat the wound as though it were an open chest wound. Some of the signs and symptoms of an open chest wound are given below.

- a. Sucking or hissing sounds coming from chest wound. (When a casualty with an open chest wound breathes, air goes in and out of the wound. This air sometimes causes a "sucking" sound. Because of this distinct sound, an open chest wound is often called a "sucking chest wound.")
- b. Casualty coughing up blood (hemoptysis).
- c. Frothy blood coming from the chest wound. (The air going in and out of an open chest wound causes bubbles in the blood coming from the wound.)
- d. Shortness of breath or difficulty in breathing.
- e. Chest not rising normally when the casualty inhales. (The casualty may have several fractured ribs, resulting in a flail chest.)
- f. Pain in the shoulder or chest area that increases with breathing.
- g. Bluish tint of lips, inside of mouth, fingertips, or nail beds (cyanosis). (This color change is caused by the decreased amount of oxygen in the blood.)
- h. Signs of shock such as a rapid and weak heartbeat.

## **4-3. CHECKING FOR OPEN CHEST WOUNDS**

Check for both entry and exit wounds. Look for a pool of blood under the casualty's back and use your hand to feel for wounds.

- a. If there is more than one open chest wound, treat the more serious (largest, heaviest bleeding) wound first.
- b. If there is more than one wound to a side, such as an entrance and exit wound, apply the flutter valve seal to the wound on the casualty's front and a full seal (all four sides taped down) to the wound on the casualty's back..

## **4-4. EXPOSING THE WOUND**

Expose the area around the open chest wound by removing, cutting, or tearing the clothing covering the wound. If clothing is stuck to the wound, do not try to remove

the stuck clothing as this may cause additional pain and injury. Cut or tear around the stuck clothing. Do not try to clean the wound or remove objects from the wound.

#### **4-5. SEALING AN OPEN CHEST WOUND**

Since air can pass through dressings and bandages, you must seal the open chest wound with plastic, cellophane, or other nonporous, airtight material to prevent air from entering the chest and collapsing the lung. The wrapper from an emergency bandage or a field first aid dressing can be used. Foil or material cut from a poncho can also be used.

**NOTE:** If possible, use supplies from the casualty's first aid kit rather than your own. You may need your supplies in case you have to administer aid to yourself later.

a. **Prepare the Sealing Material.** Cut the airtight material as needed so that it lies flat and will extend at least two inches beyond the edges of the wound (all directions).

b. **Have Casualty Exhale.** Tell the casualty to exhale (breathe out) and hold his breath. This forces some of the air out of the chest wound. The more air that can be forced out of the chest before the wound is sealed, the better the casualty will be able to breathe after the wound is sealed.

**NOTE:** The casualty can resume normal breathing after the wound is sealed.

**NOTE:** If the casualty is unconscious or cannot hold his breath, place the sealing material over the wound after his chest falls but before it rises.

c. **Apply and Tape the Airtight Material Over Wound.**

(1) Place the cleanest side of the sealing material directly over the wound. If a plastic bandage wrapper is being used, place the inside surface of the wrapper (the side without printing) directly over the wound.

(2) Check the material to make sure that it extends at least two inches beyond the wound edges in all directions. If the material does not have a two-inch margin, it may not form an airtight seal and may even be sucked into the wound. If the sealing material is not large enough or is torn, remove it and obtain other airtight material to form the seal.

(3) Tape down three edges of the material, usually the top edge and two side edges. This creates a "flutter valve" effect. When the casualty inhales, the plastic is sucked against the wound and air cannot enter the wound. When the casualty exhales, air may be able to exit the wound through the untaped (bottom) edge of the plastic. See figure 4-3.

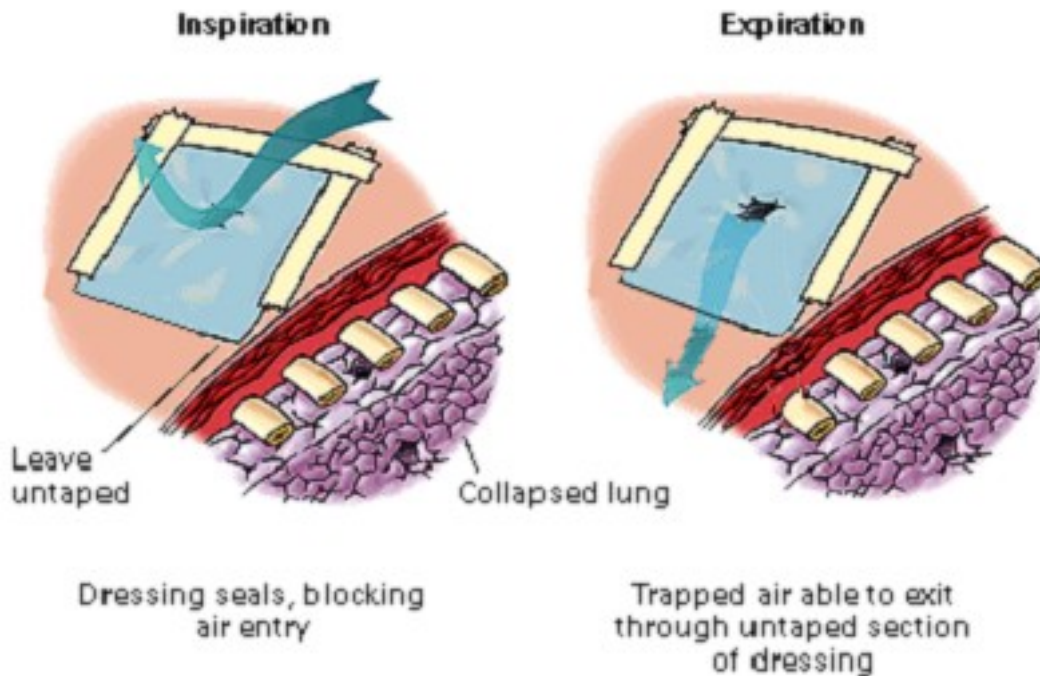


Figure 4-3. Flutter valve effects (inspiration and expiration).

**NOTE:** If there are two wounds affecting the same lung, apply airtight material to the back wound and tape down all four sides so that air cannot enter or escape.

d. **Dress the Wound.** Apply an emergency bandage (Lesson 5). The dressing and bandage will help to protect the airtight material from damage and provide pressure to the wound.

(1) Place the dressing pad directly over the plastic wrapper forming the flutter valve and secure the dressing with the bandage. The bandage should not be applied so tight that it interferes with the casualty's breathing.

(2) If the casualty is able, you can have him hold the dressing pad in place while you apply the bandage. If he cannot help, then you must hold the dressing in place while securing it.

(3) If an object is protruding from the chest wound, do not try to remove it. Place airtight material around the object to form as airtight a seal as possible. Stabilize the object by placing a bulky dressing made from the cleanest material available around the object. Apply improvised bandages to hold the sealing material and dressings in place. Do not wrap the bandages around the protruding object.

#### 4-6. POSITIONING A CASUALTY WITH A DRESSED OPEN CHEST WOUND

Position the casualty on his side (recovery position) with his injured side next to the ground (figure 4-4). Pressure from contact with the ground acts somewhat like a splint to the injured side and helps to reduce pain. (If you position the casualty with his uninjured side toward the ground, the weight on the uninjured side might make breathing difficult for the casualty.)

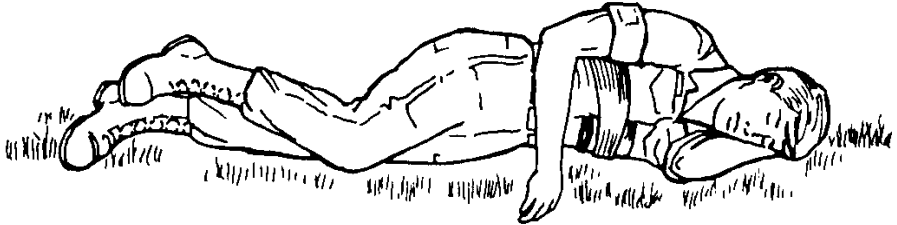


Figure 4-4. Casualty with a dressed open chest wound.

**NOTE:** The casualty may wish to sit up. If he can breathe easier when sitting up than lying on his side, allow him to sit up with his back leaning against a tree, wall, or other support. If he becomes tired, have him lie on his injured side again.

### Section II. TREATING TENSION PNEUMOTHORAX

#### 4-7. TENSION PNEUMOTHORAX

Tension pneumothorax occurs when there is a buildup of air in the plural space that cannot escape. As the air pressure outside the lung continues to increase, the affected lung continues to collapse. In addition to causing further collapse of affected lung, the increasing air pressure pushes the mediastinum (the mass of material--including the heart--that separates the two plural sacs) in the opposite direction. This movement of the mediastinum may compress the uninjured lung, major blood vessels, and the heart. You will need to perform a needle chest decompression to relieve the pressure.

#### 4-8. SIGNS AND SYMPTOMS OF TENSION PNEUMOTHORAX

a. Signs and symptoms of tension pneumothorax include the following:

- (1) Anxiety, agitation, and apprehension.
- (2) Diminished or absent breath sounds.
- (3) Increasing difficulty in breathing (dyspnea) with cyanosis (bluish tint of lips, inside of mouth, fingertips, and/or nail beds)

- (4) Rapid, shallow breathing (tachypnea).
- (5) Distended neck veins.
- (6) Abnormally low blood pressure (hypotension) evidenced by a loss of radial pulse (pulse at the wrist).
- (7) Cool, clammy skin.
- (8) Decreased level of consciousness (AVPU scale).
- (9) Visible deterioration.
- (10) Loss of consciousness.
- (11) Tracheal deviation (a shift of the windpipe to the right or left).

**NOTE:** Tracheal deviation is a late sign of tension pneumothorax and will probably not be observed.

b. The above signs and symptoms may be difficult to assess in a combat situation. Therefore, assume that tension pneumothorax exists when:

- (1) The casualty has an open chest wound and
- (2) The casualty is having increasing respiratory difficulty.

#### **4-9. NEEDLE CHEST DECOMPRESSION**

**CAUTION:** A needle chest decompression is performed ONLY if the casualty has a penetrating wound to the chest and increasing trouble breathing.

a. **Gather Materials.** You will need the large bore needle and catheter unit from the first aid kit. Use the supplies in the casualty's first aid kit if possible. You will also need a strip of tape from the spool in the kit.

**NOTE:** The needle is a 14 gauge needle that is three inches in length. The rigid metal needle is covered with a flexible catheter (tube). The needle provides rigidity needed in puncturing the chest wall. When it is removed, the flexible catheter remains to allow air to escape the air pocket that is causing the tension pneumothorax.

**NOTE:** Catheter/needle unit refers to the catheter with the needle inside.

b. **Locate the Insertion Site.** The insertion site is located in the second intercostal space (the area between the second and third ribs, counting from the top) at the mid-clavicular line (an imaginary line perpendicular to the ribs approximately in line with the casualty's nipple) on the same side of the chest as the penetrating wound. Figure 4-5 shows the location of the second intercostal space. Figure 4-6 shows the mid-clavicular line.

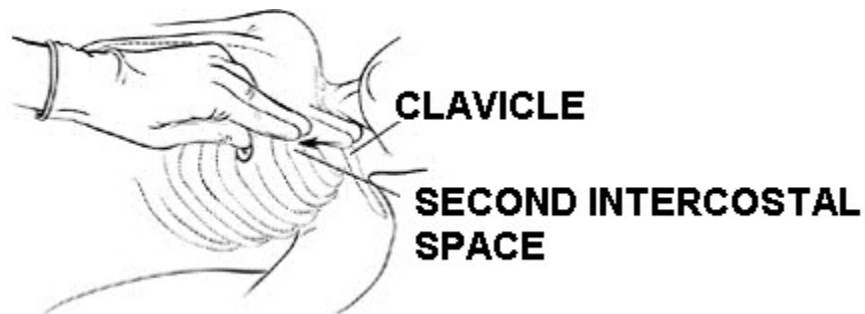


Figure 4-5. Locating the second intercostal space (wound on casualty's left side).

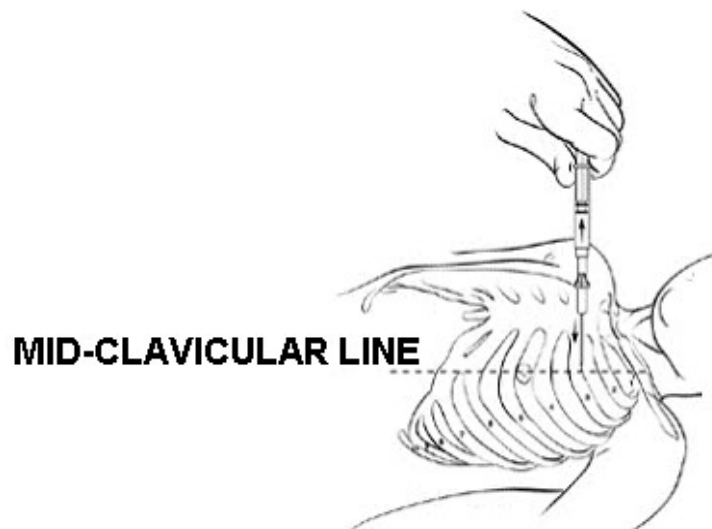


Figure 4-6. Locating the mid-clavicular line (wound on casualty's left side).

c. **Prepare Catheter/Needle Unit.** Remove the catheter/needle unit from its packaging and then remove the protective covering.

d. **Insert the Catheter/Needle.** Firmly insert the needle (with catheter covering) into the skin above the top of the third rib into the second intercostal space at a 90-degree angle (figure 4-6). Continue inserting the needle until the chest cavity has been penetrated. You will feel a "pop" as the needle enters the chest cavity. A hiss of escaping air under pressure should be heard.

**CAUTION:** Proper positioning of the needle is essential to avoid damaging blood vessels and nerves that run along the bottom of each rib.

e. **Withdraw the Needle.** Withdraw the needle from inside the catheter while holding the catheter hub to keep the catheter in place. The catheter will remain as a means for air trapped in the chest to escape to the atmosphere.

f. **Secure the Catheter.** Use the strip of tape to secure the catheter hub to the chest wall. Figure 4-7 illustrates a casualty with a catheter and flutter valve dressing in place.

g. **Monitor Casualty.** By allowing trapped air to escape from the plural area, the casualty's respirations should quickly improve. Applying airtight material over the wound and having a catheter release trapped air permits the affected lung to re-inflate somewhat (figure 4-7). If possible, monitor the casualty until medical care arrives or until the casualty is evacuated to the nearest medical facility. Be prepared to take measures to treat for shock.

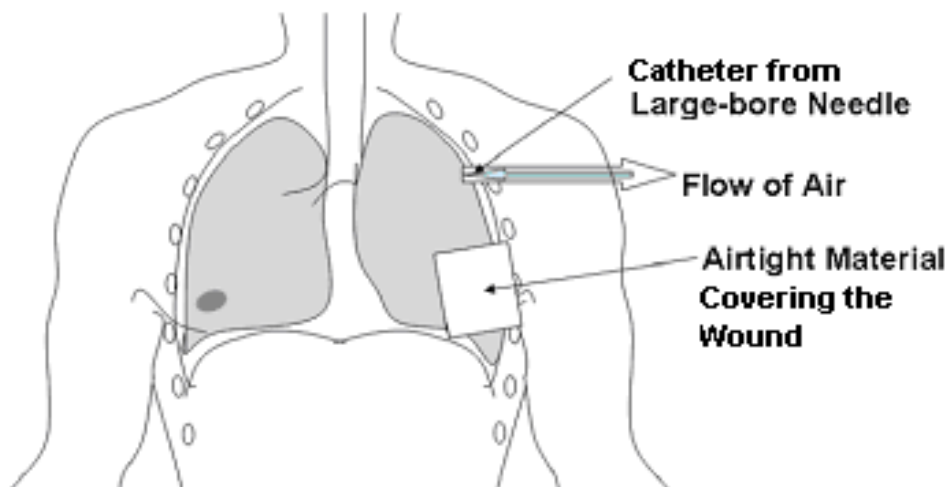


Figure 4-7. Casualty with catheter in place to relieve tension pneumothorax.

h. **Transport Casualty.** If you have performed a needle chest decompression on a casualty with a tension pneumothorax, he should be transported injured side up rather than injured side down in order to allow access to the catheter during transport. The casualty may also be transported in a sitting-up position if the casualty finds that position more comfortable.



## LESSON EXERCISES: LESSON 4

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. A soldier has been stabbed in his chest. The blade entered the chest just above his right nipple, penetrated the chest wall, and was withdrawn. Which of the following is most likely to happen?
  - a. His right lung will begin to collapse.
  - b. His left lung will begin to collapse.
  - c. Both of his lungs will begin to collapse.
  
2. A soldier has suffered a wound to the chest. You are not sure if the chest wall has been penetrated. What should you do?
  - a. Leave the wound exposed until the medic arrives.
  - b. Dress and bandage the wound as you would a cut on the arm.
  - c. Apply airtight material over the wound and tape down three sides of the material, then dress and bandage the wound.
  - d. Apply airtight material over the wound and tape down all four sides of the material, then dress and bandage the wound.
  
3. An open chest wound is sometimes called another name. What is the name?  

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4. List three signs or symptoms other than the sound of air passing through the wound that may indicate the casualty has an open chest wound.

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5. A soldier has been shot. The bullet passed through the left side of his chest (entrance and exit wounds). Which of the following is the preferred method of treatment.
- a. Apply airtight material over each wound and tape down all four sides of the material for each wound.
  - b. Apply airtight material over each wound, tape down three sides of the material for the wound on the front, and tape down all four sides of the material for the wound on the back.
  - c. Apply airtight material over each wound and tape down three sides of the material for each wound.
6. A casualty has a puncture wound to his chest about 1.5 inches in diameter. You have airtight material in the following sizes. You want to use the smallest material that fits the size criteria. Which piece should you use?
- a. Square 2 inches by 2 inches.
  - b. Square 4 inches by 4 inches.
  - c. Square 6 inches by 6 inches.
  - d. Square 8 inches by 8 inches.
  - e. Rectangle 8 inches by 12 inches.

7. When positioning a casualty with a dressed open chest wound, he should lie:
  - a. On his back.
  - b. On his front.
  - c. On his side, wounded side up.
  - d. On his side, wounded side down.
  
8. Tension pneumothorax has developed in a casualty with a chest injury to his right side. The condition could result in:
  - a. Collapse of his right lung.
  - b. Compression of his left lung.
  - c. Compression of the heart and blood vessels.
  - d. Responses a and b above.
  - e. Responses a and c above.
  - f. Responses a, b, and c above.
  
9. A casualty with an open chest wound is showing initial signs of tension pneumothorax. You should:
  - a. Raise a corner of the dressing covering the untaped side of the airtight material (over the flutter valve).
  - b. Insert a large bore needle to decompress the plural sac.
  - c. Begin cardiopulmonary resuscitation.

10. Which of the following is a sign or symptom of tension pneumothorax? (More than one response may be correct.)
- a. Skin becomes warmer and dry.
  - b. Nail beds of fingers become bluish.
  - c. You can no longer feel the casualty's pulse at his wrist.
  - d. The casualty's breathing has returned to normal.
  - e. The casualty is becoming agitated.
  - f. The veins in the casualty's neck appear to be swollen.
11. You are going to insert a catheter/needle to relieve tension pneumothorax. You should choose an insertion site that is:
- a. On the top of the chest and on the injured side.
  - b. On the side of the chest and on the injured side.
  - c. On the top of the chest and on the uninjured side.
  - d. On the side of the chest and on the uninjured side.
  - e. In the middle of the chest over the sternum (breastbone).
12. The insertion site to relieve tension pneumothorax should be:
- a. Slightly below the second rib.
  - b. Slightly above the third rib.
  - c. Slightly below the third rib.
  - d. Slightly above the fourth rib.
  - e. Slightly below the fourth rib.
  - f. Slightly above the fifth rib.

13. The insertion site to relieve tension pneumothorax is located along the casualty's mid-clavicular line. What else is located on or near this imaginary line?

---

14. You are inserting a catheter/needle to relieve tension pneumothorax. How can you tell when you have penetrated the chest wall and the tip of the needle is now in the plural space?

---

15. Once you have penetrated the plural space with a large bore needle, you should:

- a. Tape the needle in place.
- b. Remove the needle and tape airtight material over the injection site.
- c. Remove the needle, leaving the catheter, and tape the catheter hub to the chest.
- d. Remove the needle, leaving the catheter, and tape airtight material over the injection site.

16. A casualty who has a catheter from a needle chest decompression is being evacuated. How should he be positioned on the litter?

- a. On his back.
- b. On his stomach.
- c. On his injured side (the side with the catheter).
- d. On his uninjured side (the side without the catheter).

17. Using a manikin or fellow student, practice treating an open chest wound.

18. If an appropriate manikin and appropriate supplies are available, practice performing a needle chest decompression.

## SOLUTIONS TO LESSON EXERCISES: LESSON 1

1. a (para 4-1)
2. c (paras 4-2, 4-5)
3. Sucking chest wound (para 4-2a)
4. Any three of the following (paras 4-2 b through h)  
Coughing up blood  
Bubbles in blood on chest  
Breathing problems (shortness of breath, etc.)  
Abnormal chest actions (flail chest)  
Pain that increases when inhaling  
Cyanosis  
Pulse rate increases, but becomes weaker
5. b (para 4-3)
6. c (para 4-5c(2)). The wound size is 1.5 inches in diameter. Two inches beyond the wound equals  $2" + 1.5" + 2" = 5.5"$  diameter. The 6"x6" square is the smallest material to contain a circle with a 5.5" diameter.
7. d (para 4-6)
8. f (para 4-7)
9. b (para 4-7)
10. b, c, e, f (para 4-8a)
11. a (para 4-9b)
12. b. (paras 4-9b, d, d Caution)
13. nipple (para 4-9b, fig 4-6)
14. Feel a "pop" or Hear air escaping. (either or both) (para 4-9d)
15. c (paras 4-9e, f)
16. d (para 4-9h)
17. See checklist on the following page.
18. See second checklist.

### TREAT AN OPEN CHEST WOUND

**Given:** Simulated conscious casualty with open chest wound(s) indicated  
Appropriate airtight material for seal  
Tape (from first aid kit)  
Emergency bandage (from first aid kit)  
Knife or other instrument to cut/prepare sealing material

	GO	NO-GO
1. Checks casualty for entrance and exit wound.	_____	_____
2. Exposes wound.	_____	_____
3. Prepares airtight material that will extend at least 2 inches beyond the edge of the wound on all sides.	_____	_____
4. Has casualty exhale and hold breath.	_____	_____
5. Places airtight material over wound so that airtight material extends at least 2 inches beyond edges of wound.	_____	_____
6. Tapes three sides of airtight material to chest.	_____	_____
7. If two wounds, repeats steps 2 through 6 except that all four sides are taped to the chest.	_____	_____
8. Dresses and bandages the wound.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO

## PERFORM A NEEDLE CHEST DECOMPRESSION

**Given:** Simulated casualty (manikin) with dressed chest wound  
Large bore needed with catheter (from first aid kit)  
Tape (from first aid kit)

	GO	NO-GO
1. Identifies insertion site (second intercostal space above third rib on mid-clavicular line on injured side).	_____	_____
2. Removes catheter/needle unit from packaging and removes protective cover.	_____	_____
3. Inserts catheter/needle unit into insertion site at approximately a 90-degree angle.	_____	_____
4. Continues insertion until chest wall is penetrated ("pop" is felt, air heard escaping). (Instructor may need to inform student that there is a "pop" and/or sound of escaping air if the manikin is not designed to provide these clues.)	_____	_____
5. Removes the needle, leaving the catheter in place.	_____	_____
6. Secures the catheter hub to the chest wall using the strip of tape.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	<b>GO</b>	<b>NO-GO</b>



## **LESSON ASSIGNMENT**

### **LESSON 5**

Controlling Bleeding.

### **LESSON ASSIGNMENT**

Paragraphs 5-1 through 5-16.

### **LESSON OBJECTIVES**

After completing this lesson, you should be able to:

- 5-1. Given information about a simulated casualty with bleeding from an extremity, determine what should be done to control the bleeding.
- 5-2. Identify the procedures for applying an emergency bandage.
- 5-3. Identify the procedures for applying a Combat Application Tourniquet.
- 5-4. Identify the procedures for applying an improvised tourniquet.
- 5-5. Identify the procedures for applying a field first aid dressing.
- 5-6. Identify the procedures for applying an improvised pressure dressing.
- 5-7. Identify the procedures for treating a wound with an impaled object.
- 5-8. Identify the procedures for using pressure points to control bleeding.
- 5-9. Identify signs and symptoms of shock
- 5-10. Identify methods of controlling shock.

### **REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
Training Support Package 071-D-2318 / First Aid 3  
(Control Bleeding and Treat Burns).

### **SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 5

### CONTROLLING BLEEDING

#### Section I. GENERAL

##### 5-1. INTRODUCTION

The leading preventable cause of death on the battlefield is bleeding from an extremity. Bleeding (hemorrhaging) from an extremity can usually be controlled by applying an emergency bandage, by applying manual pressure and elevating the injured limb, by applying pressure to pressure points, and by applying tourniquets. If bleeding from an extremity is not controlled, shock could result. Hypovolemic (low blood volume) shock can result in the casualty's death.

**NOTE:** Although the procedures are given for administering buddy-aid to a fellow soldier, they can also be used in administering treatment to yourself (self-aid).

##### 5-2. TERMINOLOGY

As you go through this lesson, it will be helpful to know the meaning of certain terms as they are used in this subcourse.

a. **Extremity.** One of the limbs.

(1) Upper extremity. Upper extremity refers to the arm (located between the shoulder and the elbow) and the forearm (located between the elbow and the wrist). Often, the term "arm" is used to refer to the arm, forearm, and hand. The terms "upper arm" and "lower arm" are sometimes used to refer to the arm and forearm respectively.

(2) Lower extremity. Lower extremity refers to the thigh (located between the hip and the knee) and the leg (located between the knee and the ankle). Often, the term "leg" is used to refer to the thigh, leg, and foot. The terms "upper leg" and "lower leg" are sometimes used to refer to the thigh and leg respectively.

b. **Hemorrhage.** Hemorrhage is another word for bleeding. It is usually used to refer to serious bleeding.

c. **Artery.** Arteries are blood vessels that carry blood away from the heart to the parts of the body.

d. **Vein.** Veins are blood vessels that carry blood from the parts of the body back to the heart.

e. **Dressing.** The term "dressing" refers to the material that is placed directly over the wound. The dressing absorbs some of the blood and helps a clot to form. The clot "plugs" the wound to stop the bleeding. The dressing also protects the wound from additional contamination and injury.

f. **Bandage.** A bandage is the material used to hold (secure) the dressing in place so the dressing will not slip and destroy the clot that is forming. The end of the bandage is called the tail.

g. **Tourniquet.** A tourniquet is a device for compressing the blood vessels of an extremity in order to stop blood flow distal to the tourniquet band.

h. **Distal.** Distal means away from the point of reference. In this lesson, the heart is the central point. The hand is distal to the elbow because the hand is farther from the heart than is the elbow. (Follow the path of blood flow from the heart through the arteries as a guideline.) It is the opposite of proximal.

i. **Proximal.** Proximal means toward the point of reference (heart). The knee is proximal to the foot because the knee is closer to the heart (following blood flow) than is the foot. It is the opposite of distal.

j. **Amputation.** Amputation is used to refer to the condition where a body part has been severed from the rest of the body.

(1) An amputation is "complete" if the body part has been completely severed.

(2) An amputation is "partial" if the body part is still attached by skin.

## **Section II. PROCEDURES FOR CONTROLLING BLEEDING**

### **5-3. PREPARING THE WOUND**

**NOTE:** It is assumed that you and the casualty are in an area where you can safely administer first aid, that you are not in a chemical environment, that you have already evaluated the casualty as explained in Lesson 2, and the casualty is breathing on his own.

a. **Put on Gloves.** Put on examination gloves found in the casualty's first aid kit. The gloves will help to protect you from the casualty's fluids and also to help reduce the contamination of the casualty's wounds.

**CAUTION:** Monitor the casualty's respirations, especially if he is unconscious. If the casualty stops breathing, administer mouth-to-mouth or mouth-to-nose resuscitation (see Lesson 3).

b. **Expose the Wound.** If at all possible, expose the wound first by pushing or cutting away (bayonet, knife, etc.) loose clothing around the casualty's wound. This will enable you to better view the extent of the injury.

(1) If clothing is stuck to the wound, do not try to remove the clothing. Cut or tear the clothing, if possible, so that the stuck material remains undisturbed.

(2) If there is debris in the wound, do not try to remove it from the wound.

**WARNING**

Do not remove protective clothing in a chemical environment. Apply dressings over the protective clothing without exposing the wound.

c. **Check for Entrance and Exit Wounds.** Examine the casualty to determine if there is more than one wound. A missile may have entered at one point and exited at another point. The exit wound is usually larger than the entrance wound. If there is an entrance wound and an exit wound, both wounds need to be treated.

(1) If a missile penetrates and lodges in the body (fails to exit), do not attempt to remove the object or probe the wound.

(2) If there is an object extending from (impaled in) the wound, do not remove the object. Apply improvised bulky dressing material made from the cleanest material available to build up the area around the object. This will stabilize the object and help prevent further injury. Apply a bandage over the bulky materials to hold them in place.

#### **5-4. APPLYING AN EMERGENCY BANDAGE**

The emergency bandage (figure 5-1) can be used on any bleeding wound. It can be used both as a field dressing and as a pressure dressing. The emergency bandage consists of a sterile white pad with an elastic bandage (tail) and a pressure device used to control the amount of pressure applied to the wound. The emergency bandage is also known as the "emergency trauma dressing," "emergency trauma bandage," "Israeli dressing," and "Israeli bandage." It has replaced the old field first aid dressing. Use the following procedures when applying the emergency bandage to a wound on the casualty's extremity.



A. Emergency bandage in packet.



B. Emergency bandage removed from packet.

Figure 5-1. Emergency bandage.

- a. Remove the emergency bandage from the casualty's first aid kit.
- b. Remove the emergency bandage from the packaging and prepare it for use.
- c. Place the pad (dressing) on the wound.
- d. Wrap the elastic bandage around the wounded extremity (figure 5-2 A).
- e. Insert the elastic bandage completely into the pressure bar (figure 5-2 B).
- f. Pull the elastic bandage back over the top of the pressure bar, forcing the bar down onto the pad (figure 5-2 C).



A. Wrap the bandage around the limb.



B. Insert the bandage into the pressure bar.



Pull the bandage over top of the pressure bar.



C.

D. Wrap bandage tail around the limb to seal the edges of the pad.



E. Secure the closing bar.

Figure 5-2. Applying an emergency bandage to a wound on the forearm.

g. Wrap the elastic bandage tightly over the pressure bar.

h. Continue to wrap the elastic bandage around the limb so that all edges of the dressing pad are covered (figure 5-2 D). (This helps to prevent dirt and contaminated material from getting under the dressing and into the wound.)

i. Secure the hooking end of the closing bar into the elastic bandage (figure 5-2 E). The bandage is now secure.

j. Check the blood circulation below (distal to) the bandage. The bandage should be tight enough to secure the dressing pad in place and place some pressure on the wound (the pressure helps to collapse the ends of severed blood vessels, thus reducing bleeding). However, it should not be tight enough to stop all blood circulation below the bandage.

(1) If there is no pulse, loosen the bandage and reapply. Then recheck the circulation.

(2) If the skin below the bandage becomes cool to the touch, bluish, or numb, the bandage may be too tight and interfering with circulation. Loosen the bandage and reapply. Then recheck the circulation.

(3) If loosening the bandage does not restore blood circulation to the part, the casualty should be evacuated as soon as possible.

**NOTE:** If the wound continues to bleed, you may need to remove the dressing, reevaluate the wound, reposition the dressing, and secure the dressing again.

**NOTE:** Although we are primarily concerned with using the emergency bandage to control bleeding on a limb, the emergency bandage also has other uses. Figure 5-3 shows the emergency bandage applied to some other injuries.



Figure 5-3. Emergency bandage applied to various injuries.

### 5-5. APPLYING MANUAL PRESSURE AND ELEVATION

Two additional methods of controlling bleeding are to apply additional pressure over the wound and to elevate the wound.

a. **Manual Pressure.** If practical, apply direct pressure over the dressing with your hand. This pressure will help to compress the damaged blood vessels and control the bleeding. Maintain this pressure for 5 to 10 minutes. If the casualty is conscious and can follow instructions, you can have him apply the manual pressure himself.

b. **Elevating the Limb.** Elevating the injured limb above the level of the casualty's heart to decrease the bleeding. An injured leg can be raised by placing the foot and ankle on a stable object, such as a pack, log, or rock, such as illustrated in figure 5-9 G. An injured forearm can be elevated by placing the forearm on the casualty's chest if he is lying on his back or by having the casualty place his arm on top



of his head if he is sitting. Elevating the injured limb and applying manual pressure should be done at the same time when no fracture is involved.

## **5-6. APPLYING PRESSURE TO PRESSURE POINTS**

Applying digital pressure to “pressure points” is another method of controlling bleeding. This method uses pressure from the fingers, thumbs, the heel of the hand, or the knee to press at the site (point) where a main artery supplying the wounded area lies near the skin surface or over bone (see figure 5-4). This pressure can reduce the flow of blood from the heart to the wound. It is used in combination with pressure and elevation. Two pressure points are discussed below.

a. **Arm (Brachial Artery).** Digital pressure is used to control severe bleeding of the lower part of the arm.

(1) The pressure point is located above the elbow on the inside of the arm in the groove between the muscles.

(2) Using your fingers or thumb, apply pressure to the inside of the arm over the bone.

b. **Groin (Femoral Artery).** Digital pressure is used to control severe bleeding of the thigh and lower leg.

(1) The pressure point is located on the front, center part of the crease in the groin.

(2) Using the heel of your hand or your knee, apply pressure to press the artery against the bone. Lean forward to apply pressure.

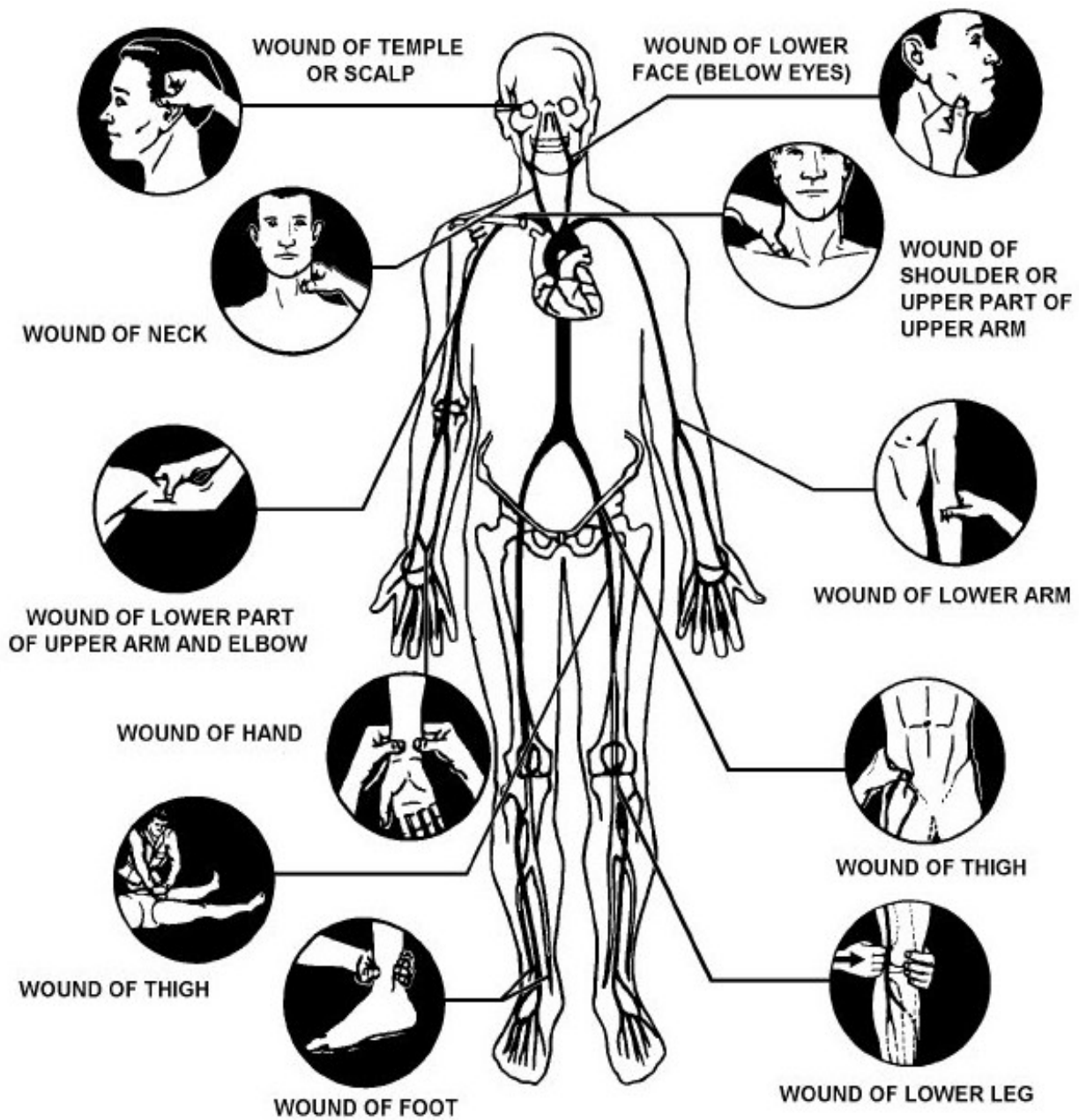


Figure 5-4. Applying digital pressure to various pressure points.

## 5-7. DETERMINING IF A TOURNIQUET IS REQUIRED.

A tourniquet is a constricting band placed around an extremity to stop arterial bleeding by stopping blood circulation to the part of the limb below (distal to) the tourniquet. Normally, a tourniquet is only used on an arm or leg where there is a danger of the casualty bleeding to death. However, if the tactical situation does not allow the time or safety for conventional methods of controlling the bleeding (you and the casualty are under fire), a tourniquet may be applied to a bleeding wound until the casualty can be moved to safety. Once you and the casualty have reached safety, consider loosening the tourniquet (do not remove the tourniquet) and using direct pressure and/or a pressure dressing to control the hemorrhage.

**NOTE:** If the tourniquet has been in place for more than 6 hours, do not remove the tourniquet.

### WARNING

A tourniquet is **not** used for wounds to the head, neck, or trunk (chest and abdominal area).

a. **Wound on an Extremity.** Bleeding from a major artery of the thigh, lower leg, or arm and bleeding from multiple arteries may prove to be beyond control by the methods discussed previously in this lesson. If the pressure dressing under firm hand pressure becomes soaked with blood and the wound continues to bleed, apply a tourniquet.

### REMEMBER

If you are unable to control bleeding except with a tourniquet, it is better to sacrifice a limb than to lose a life due to excessive bleeding.

b. **Amputation.**

(1) An amputation may be complete (the limb is completely severed) or partial (the two parts of the limb remain connected by some skin). Both require a tourniquet. Both involve bleeding from multiple arteries and are beyond control by other methods.

(2) A person whose arm or leg has been amputated may not be bleeding when first discovered, but a tourniquet should be applied anyway. This absence of bleeding is due to the body's normal defenses (contraction and clotting of blood vessels) as a result of the amputation. However, bleeding will start when the blood vessels relax or if the clot is knocked loose by moving the casualty.

## 5-8. APPLYING A COMBAT APPLICATION TOURNIQUET®

A Combat Application Tourniquet® (figure 5-5) is the tourniquet of choice. The Combat Application Tourniquet® (CAT) is effective and can be applied quickly. Procedures for applying the CAT are given below.

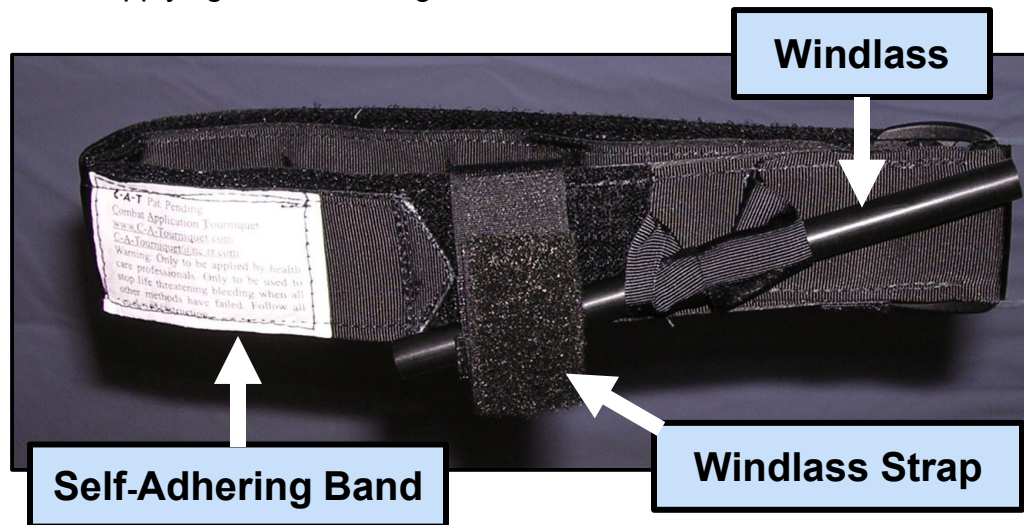


Figure 5-5. The Combat Application Tourniquet®.

- a. Remove the CAT from the casualty's first aid kit.
- b. Remove the CAT from its pouch.

**NOTE:** The CAT is packaged in its one-handed configuration.

- c. Slide the wounded extremity through the loop of the Self-Adhering Band (figure 5-6 A).
- d. Position the CAT (figure 5-6 B) two inches above the wound.

**CAUTION:** If the wound is below the knee or elbow, initially position the tourniquet band two inches above the wound. If a tourniquet applied below the knee or elbow is not successful at stopping the bleeding, apply a second tourniquet two inches above the joint (knee or elbow). Do not remove the first tourniquet until the second tourniquet has been applied.

**CAUTION:** Do not apply a tourniquet over a joint (knee or elbow).



A. Place the wounded extremity through the loop of the Self-Adhering Band.



B. Place tourniquet above the injury site.



C. Pull the free-running end of the Self-Adhering Band tight and securely fasten it back on itself.



D. Adhere Self-Adhering Band completely around the band until the clip is reached.



Twist the windlass rod until the Lock the rod in place with the bleeding has stopped.



E. F. windlass clip.

Figure 5-6. Applying the Combat Application Tourniquet® to a wound on the arm. (continued)



G. For small extremities, continue to adhere the Self-Adhering Band around the extremity and over the windlass rod.



H. Grasp the windlass strap, pull it tight, and adhere it to the Velcro on the windlass clip.



I. CAT applied and casualty ready for transport.

Figure 5-6. Applying the Combat Application Tourniquet® to a wound on the arm.  
(concluded)

**NOTE:** The second tourniquet may need because the body part below the joint (the forearm or leg) has two bones. The presence of two bones increases the difficulty of collapsing the artery completely. The body part above the joint (arm or thigh) has only one bone; therefore, the artery is easier to compress.

e. Pull the free running end of the Self-Adhering Band tight and securely fasten it back on itself (figure 5-6 C, D). Do not adhere the band past the windlass clip.

**NOTE:** The friction adaptor buckle is not necessary for proper CAT application to an arm. However, it must be used as added protection when using two hands to apply the CAT to a leg. To use, route the Self Adhering Band strap through the friction adaptor buckle (figure 5-7). This also prevents the strap from loosening during transport.

f. Twist the windlass rod until the arterial bleeding has stopped (figure 5-6 E). Darker bleeding from the veins may continue for a while.

g. Lock the rod in place with the windlass clip (figure 5-6 F).

(1) For added security (and always before moving a casualty) secure the windlass rod with the windlass strap.

(2) For small extremities, also secure the Self-Adhering Band under the windlass strap.

h. For small extremities, continue to wind the Self-Adhering Band around the extremity and over the windlass rod (figure 5-6 G).

i. Grasp the windlass strap, pull it tight, and adhere it to the Velcro on the windlass clip (figure 5-6 H). The CAT is now ready for transport (figure 5-6 I).

j. Check for a pulse below the tourniquet. If the tourniquet is functioning properly, there will be no pulse and arterial bleeding (spurting bright red blood) will have ceased. Darker blood may still be seeping from the veins and should be ignored.

A. Wrapping the Self-Adhering Band



Band through the friction adaptor buckle to prevent the Self-Adhering Band from loosening during transport.

B. CAT applied to a complete amputation.



**NOTE:** The friction adaptor buckle is not necessary for proper CAT application to an arm. It **MUST** be used with two hands when applied to a leg.

Figure 5-7. Applying the Combat Application Tourniquet® to the thigh. (large extremity application).

## 5-9. MARKING THE CASUALTY

Write the letter "T" and the time the tourniquet was applied on the casualty's forehead with a pen, the casualty's blood, mud, or other substance. The "T" alerts medical personnel that a tourniquet has been applied.

## 5-10. DRESSING AN AMPUTATION

After the tourniquet has been applied to a complete amputation, place a dressing made of soft, absorbent material over the end of the stump and secure the dressing with bandages. The dressing will help to prevent additional contamination of the wound and will help to protect the wound from additional injury.

a. If the amputation was complete, take care of the amputated part. If possible, rinse the amputated part free of debris, wrap it loosely in saline-moistened sterile gauze, seal the amputated part in a plastic bag or cravat, and place it in a cool container.

**CAUTION:**     **DO NOT** freeze the amputated part.  
                  **DO NOT** place amputated part in water.  
                  **DO NOT** place the amputated part directly on ice.  
                  **DO NOT** use dry ice to cool the amputated part.  
                  **DO NOT** place the amputated part where it is view of the casualty.

b. If the amputation was partial, splint the two parts of the limb as though it were a fracture.

## 5-11. TAKE MEASURES TO PREVENT/CONTROL SHOCK

Hypovolemic (low blood volume) shock can result in death. Take measures to prevent or control shock.

a. **Signs and Symptoms.** Hypovolemic shock is usually caused by severe bleeding, but it can also be caused by a severe loss of body fluids from severe burns, vomiting, diarrhea, and excessive sweating from heat injury. Other signs and symptoms of shock include:

- (1) Sweaty but cool (clammy) skin.
- (2) Pale skin.
- (3) Restlessness, nervousness, or agitated behavior.
- (4) Unusual thirst.
- (5) Confused mental process.



- (6) Rapid breathing.
- (7) Blotchy bluish skin, especially around the mouth.
- (8) Nausea.

b. **Measures for Preventing/Controlling Shock.** Initiate procedures to control shock even if signs and symptoms are not yet present.

(1) Position the casualty. Position the casualty on his back. If possible, place a poncho or blanket under the casualty to protect him from the temperature or dampness of the ground. Elevate the casualty's legs so that his feet are slightly higher than the level of his heart. (This helps the blood in the veins of his legs to return to his heart.) Place a small log, field pack, box, rolled field jacket, or other stable object under the casualty's feet or ankles in order to maintain the elevation. Exceptions to the normal shock position are described below.

**CAUTION:** Do not elevate the legs until all lower limb fractures have been splinted.

(a) Spinal injuries. Keep a casualty with a suspected spinal fracture or a severe head injury as still as possible. Do not elevate the casualty's legs. Immobilize his head, neck, and back, if possible.

(b) Open chest wounds. If the casualty wants to sit up, help him to sit with his back to a wall, tree, or other support. Sitting may help him to breathe easier. If the casualty wants to lie down, position him so that he is lying on his injured side. (Lying on his injured side may help to control pain. Also, this permits the uninjured side to breathe easier.)

(c) Open abdominal wounds. Keep the casualty on his back with his knees flexed (raised) with his feet on the ground. Keeping the knees flexed reduces stress to the abdomen.

(d) Minor head wound. A casualty with a minor head wound should be allowed to sit up. If the casualty has bleeding into the mouth or if he does not want to sit up, position him on his side with his wound up and his head turned so that fluid can drain from his mouth.

(e) Unconsciousness. Position an unconscious casualty on his side with his head turned so fluids can drain from his mouth. If the casualty vomits, quickly perform a finger sweep to clear his airway.

(2) Splint the limb, if appropriate. Splinting the injured limb can reduce additional damage to the limb and help to reduce pain and the risk of shock.

(a) If one or more bones in the limb have been fractured, apply a splint to the injured limb. Broken bone fragments may grate on blood vessels and nerves and cause additional damage.

(b) It is good practice to splint the arm, forearm, thigh, or leg when a severe wound is present even if the limb is not fractured. Immobilizing the limb helps to stop bleeding and reduce pain. It reduces muscular activity, which can increase the rate of blood flow (and, therefore, blood loss).

(c) If the casualty has suffered an incomplete amputation, splint the limb.

(3) Prevent chilling or overheating.

(a) In cool weather, cover the casualty with a blanket, poncho, or other available materials to keep him from losing body heat. Place covering under the casualty as well as over the casualty in order to prevent chilling.

**CAUTION:** Blood loss can cause a significant drop in body temperature even in hot weather.

(b) In warm weather, keep the casualty in the shade. If natural shade is not available, erect an improvised shade using a poncho and sticks or other available materials. Fanning the casualty promotes the evaporation of perspiration, which will cool the casualty.

(4) Reassure the casualty. Keep the casualty calm. Tell the casualty that you are helping him. Be confident in your ability to help the casualty and have a "take charge" attitude. Your words and actions can do much to reduce his anxiety. Be careful of any comments you make regarding the casualty's condition.

(5) Seek help. If possible, send a soldier to get the combat medic. If a combat lifesaver is available, send for him. Both the combat lifesaver (a non-medical soldier trained in advanced first aid) and the combat medic can start an intravenous infusion to help restore the volume in the casualty's blood circulatory system.

**CAUTION:** If the casualty is in shock, do not give him anything to eat or drink.

**CAUTION:** If you leave the casualty in order to seek medical help, tell the casualty that you are going to get medical help and will return. Before leaving, turn the casualty's head to one side. This position will help to keep the casualty from choking should he vomit.

## 5-12. EVACUATING THE CASUALTY

Evacuate a casualty with a tourniquet to the nearest medical treatment facility (MTF) as soon as possible. See Lesson 7 for instructions on evacuating the casualty on a SKED or improvised litter. The combat medic or combat lifesaver can request a medical evacuation (MEDEVAC) for the casualty if needed.

a. Do not cover the tourniquet. Leave the tourniquet in full view so that medical personnel can locate it quickly.

b. Continually monitor the casualty for development of conditions that may require the performance of necessary basic lifesaving measures such as clearing the airway, performing mouth-to-mouth resuscitation, and preventing shock.

c. If a complete amputation is involved, prepare the amputated part as described previously and transport with the casualty. Do not place the amputated part so that it is in view of the casualty.

### Section III. OTHER PROCEDURES

## 5-13. GENERAL

Section II dealt with the normal treatment procedures and supplies that you will probably have available. This section covers some other supplies and procedures including the field first aid dressing, improvised pressure dressing, and improvised tourniquet. . The field first aid dressing is being replaced by the emergency bandage, but may still be available in some cases.

## 5-14. APPLYING A FIELD FIRST AID DRESSING

The field first aid dressing (figure 5-8) consists of a pad of sterile (germ-free) white dressing with a bandage (usually olive-drab) already attached to the dressing pad. The field first aid dressing is wrapped in paper and then sealed in a plastic envelope. The field dressing is also called the "field dressing" and the "combat dressing."

### a. **Open the Field Dressing.**

**NOTE:** Although the following illustrations do not show the rescuer wearing gloves, you should put on gloves from the casualty's first aid kit.

- (1) Obtain the dressing from the casualty's first aid pouch.
- (2) Tear the plastic envelope and remove its contents.

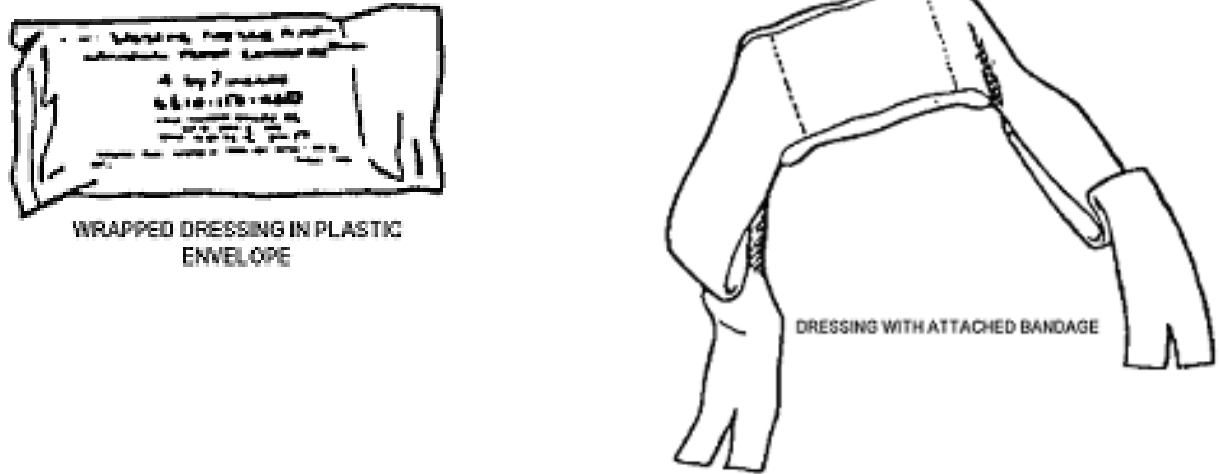


Figure 5-8. Field dressing.

- (3) Twist the paper wrapper until it breaks or tear it open.
- (4) Grasp the folded olive drab tails of the field dressing with both hands (figure 5-9 A).

**b. Apply the Field Dressing.**

- (1) Hold the field dressing directly above the wound with the white side of the dressing material toward the wound.
- (2) Pull on the tails so that the dressing opens and flattens (figure 5-9 B).

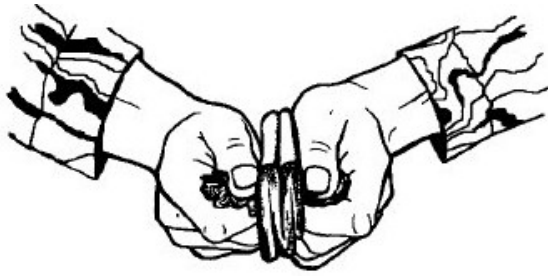
**CAUTION:** Do not touch the white (sterile) side of the dressing. Do not allow the white (sterile) side of the dressing come into contact with any surface other than the wound.

- (3) Place the white part of the dressing directly over the wound (figure 5-9 C).

**c. Secure the Dressing.**

- (1) Place one hand on top of the dressing to hold the dressing in place.

**NOTE:** If the casualty is conscious and able, you can have him hold the dressing in place while you secure it.



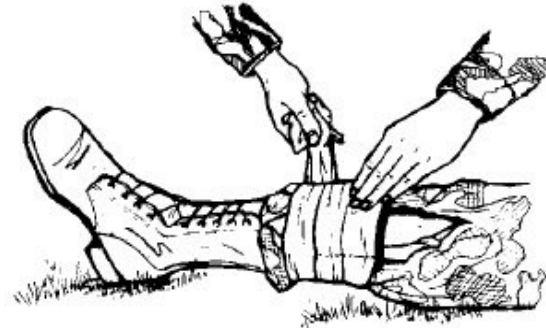
A. Grasping the tails of the bandages.



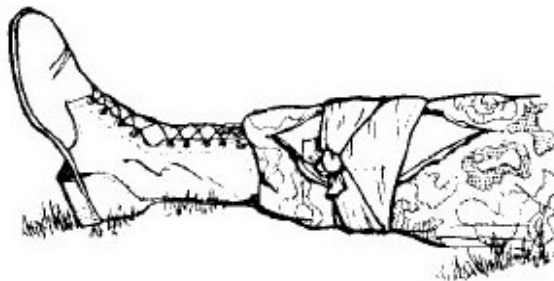
B. Pulling the dressing open.



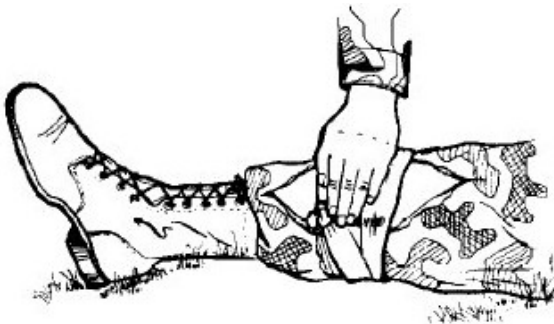
C. Applying the dressing.



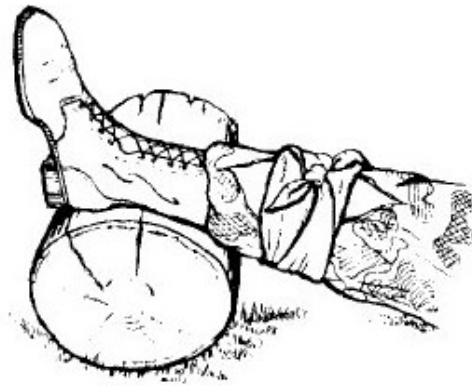
D. Wrapping the tails around the limb.



E. Knot tied at outer edge of dressing.



F. Manual pressure applied to dressing.



G. Limb elevated.

Figure 5-9. Applying a field first aid dressing, manual pressure, and elevation to an extremity.

(2) Wrap one of the tails around the injured body part with your free hand. As you wrap, cover one of the exposed sides of the dressing with the bandage. (The bandage can usually be wrapped around a limb more than once.) Bring the tail back over the dressing (figure 5-9 D). The second tail is held in the palm of the hand holding the dressing in place.

(3) Wrap the other tail around the injured body part in the opposite direction. As you wrap, cover the remaining exposed side of the dressing with the bandage. Bring the tail back to the dressing.

**NOTE:** Using the tails to seal the exposed edges of the dressing will prevent foreign material from getting under the dressing and contaminating the wound.

(4) Tie the tails into a nonslip knot over the outer edge of the dressing (figure 5-9 E). The tails should be tied firm enough to prevent the dressing from slipping, but loose enough to insert two fingers between the knot and the dressing.

d. **Check Circulation.** After the knot is tied, check the blood circulation below (distal to) the bandage. If the skin below the bandage becomes cool to the touch, bluish, or numb, the bandage may be too tight and interfering with circulation. Also check to see if you can detect a pulse below the bandage. If blood circulation is impaired, loosen and retie the tails; then check the circulation again. If circulation is not restored, evacuate the casualty as soon as possible. Medical treatment may be needed to save the limb.

e. **Apply Manual Pressure.** If practical, apply direct pressure over the dressing with your hand (figure 5-9 F). This pressure will help to compress the damaged blood vessels and control the bleeding. Maintain this pressure for 5 to 10 minutes.

**NOTE:** If the casualty is conscious and can follow instructions, you can have him apply the manual pressure himself.

f. **Elevate the Injured Limb.** Elevate the injured limb above the level of the casualty's heart to decrease the bleeding. An injured leg can be raised by placing the foot and ankle on a stable object such as a pack, log, or rock (figure 5-9 G). An injured forearm can be elevated by placing the forearm on the casualty's chest if he is lying on his back or by having the casualty place his arm on top of his head if he is sitting. Elevating the injured limb and applying manual pressure should be done at the same time when no fracture is involved.

**CAUTION:** Examine the injured extremity for fractures (visible broken bone, deformity of the limb, etc.) before elevating the limb. If a fracture is suspected, do not elevate the wound until the limb has been properly splinted.

## 5-15. APPLYING A PRESSURE DRESSING

If blood continues to seep from the dressing after you have secured the field first aid dressing, applied manual pressure, and elevated the wound (if applicable), apply a pressure dressing. Keep the injured extremity elevated while applying the pressure dressing.

a. Place a wad of padding on top of the dressing and directly over the wound (figure 5-10 A). The wad can be made from a folded muslin bandage (cravat), a rag, material torn from clothing, or other material that can be folded several times.

b. Place a cravat over the wad of padding (figure 5-10 B) and wrap the cravat tightly around the limb, covering the field dressing (figure 5-10 C).

(1) The cravat can be made from a muslin bandage or material torn and folded into a cravat (see figure 5-11). Other materials such as a handkerchief, sock, or strip of cloth torn from a shirt can also be used.

(2) Wire and narrow material, such as a shoestring, are not used since they are likely to damage blood vessels and nerve tissue.

c. Tie the ends of the cravat in a nonslip knot to secure the wad of padding (figure 5-10 D). Tie the nonslip knot directly over the wound. The cravat should be tight enough so only the tip of one finger can be inserted under the cravat. Do not tie the cravat so tight that it cuts off blood circulation. The pressure on the wad of dressing helps collapse the blood vessels and control the bleeding.

d. Check the circulation below the pressure dressing. If the skin below the pressure dressing becomes cool to the touch, bluish, or numb, or if the pulse below the pressure dressing is no longer present, the pressure dressing may be too tight. If circulation is impaired, loosen and retie the cravat. If circulation is not restored, evacuate the casualty as soon as possible.

**NOTE:** The pressure dressing can be loosened and retied without disturbing the blood clot forming under the field dressing.]

e. Apply manual pressure over the pressure dressing while keeping the limb elevated.

(1) If the pressure dressing controls the bleeding, proceed to check the casualty for other injuries.

**CAUTION:** Check the distal end of wounded extremity (fingers or toes) periodically for adequate circulation. The pressure dressing must be loosened and reapplied if the area below the dressing becomes cool, blue, or numb. If circulation is not restored, evacuate the casualty as soon as possible.



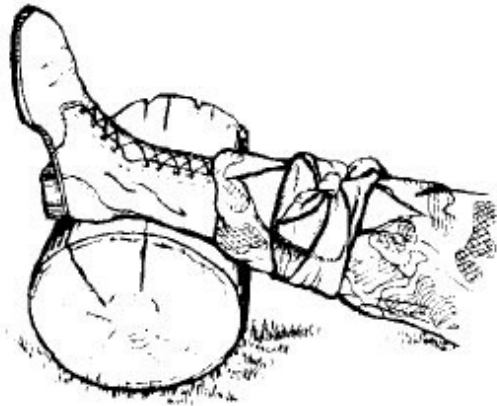
A. Applying a wad on top of the field dressing.



B. Placing an improvised cravat over the wad.



C. Wrapping the cravat around the limb.



D. Nonslip knot tied on top of the dressing and over the wound.

Figure 5-10. Applying an improvised pressure dressing.

(2) If the wound continues to bleed, apply digital pressure. If applying digital pressure does not control the bleeding, apply a tourniquet.

#### **5-16. APPLYING AN IMPROVISED TOURNIQUET**

In the absence of a specially designed tourniquet such as the CAT, a tourniquet may be made from a strong, pliable material such as gauze or muslin bandages and clothing. An improvised tourniquet is used with a rigid, stick-like object. To minimize skin damage, ensure that the improvised tourniquet is at least two inches wide.



**a. Gather Materials for Making a Tourniquet.**

(1) Tourniquet band. You need a band of strong, pliable material that is at least two inches wide when folded and will retain this width after being tightened. A folded muslin bandage (usually called a cravat), a folded handkerchief, or a folded strip of clothing will do. A belt, rope, strap from LBE (load bearing equipment), roller gauze, or a torn sleeve can also be used. Do not use wire or shoestrings as a tourniquet band. A wide tourniquet will protect the tissue beneath the tourniquet when it is tightened. If a very narrow tourniquet is used, the nerves and blood vessels beneath the tourniquet may be seriously damaged.

**NOTE:** Figure 5-11 illustrates how to fold material into a cravat. The square material is cut in half along the diagonal (base) to form two triangular bandages. Each triangular bandage can be made into a cravat.

(2) Rigid windlass. A strong, rigid windlass is needed to tighten the tourniquet band. Such a windlass is shown in figure 5-12.

(3) Securing materials. Additional material is needed to secure the rigid windlass once the tourniquet band has been tightened. A piece of cloth or cravat similar to the tourniquet band can serve as securing material.

**b. Select the Tourniquet Site.** Select a site two to four inches above the edge of the wound or amputation site.

(1) If the wound or amputation site is in the upper arm or thigh, select a site that is two to four inches above the edge of the wound or amputation site.

(2) If the wound or amputation is below the elbow or knee, initially select a site two inches above the edge of the wound or amputation site. If an improvised tourniquet applied below the knee or elbow is unsuccessful at stopping the bleeding, apply a second tourniquet two to four inches above the joint (knee or elbow). Do not remove the first tourniquet until the second tourniquet has been applied.

**CAUTION:** Do not place a tourniquet over a joint or over a fracture site.

**c. Apply the Tourniquet.**

(1) Place the tourniquet band material around the tourniquet site.

(2) Tie the band with a half-knot (the same as the first part of tying a shoe) (figure 5-12 A).

(3) Place the windlass on top of the half-knot.

(4) Tie a full knot (square knot) over the windlass (figure 5-12 B).

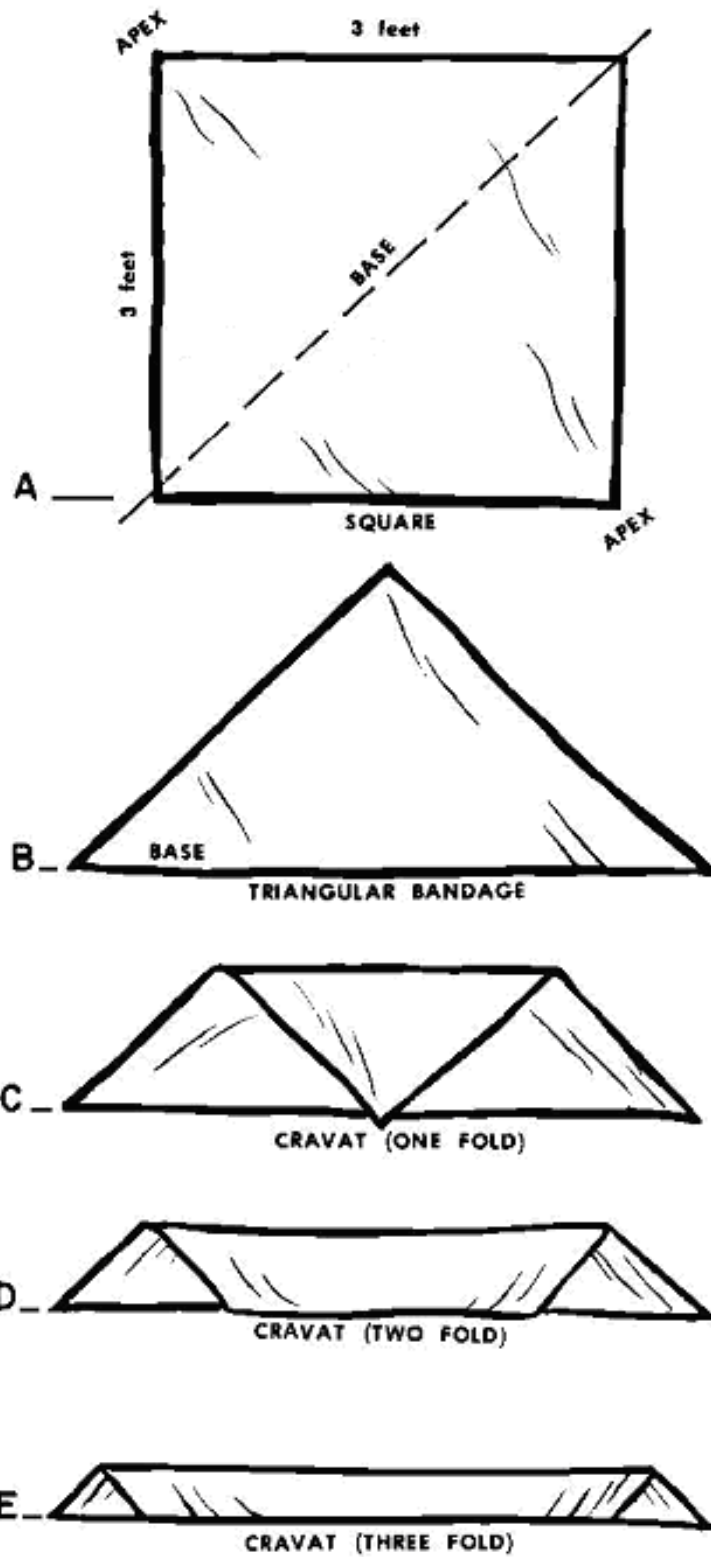


Figure 5-11. Folding a muslin bandage or a square of material into a tourniquet band.

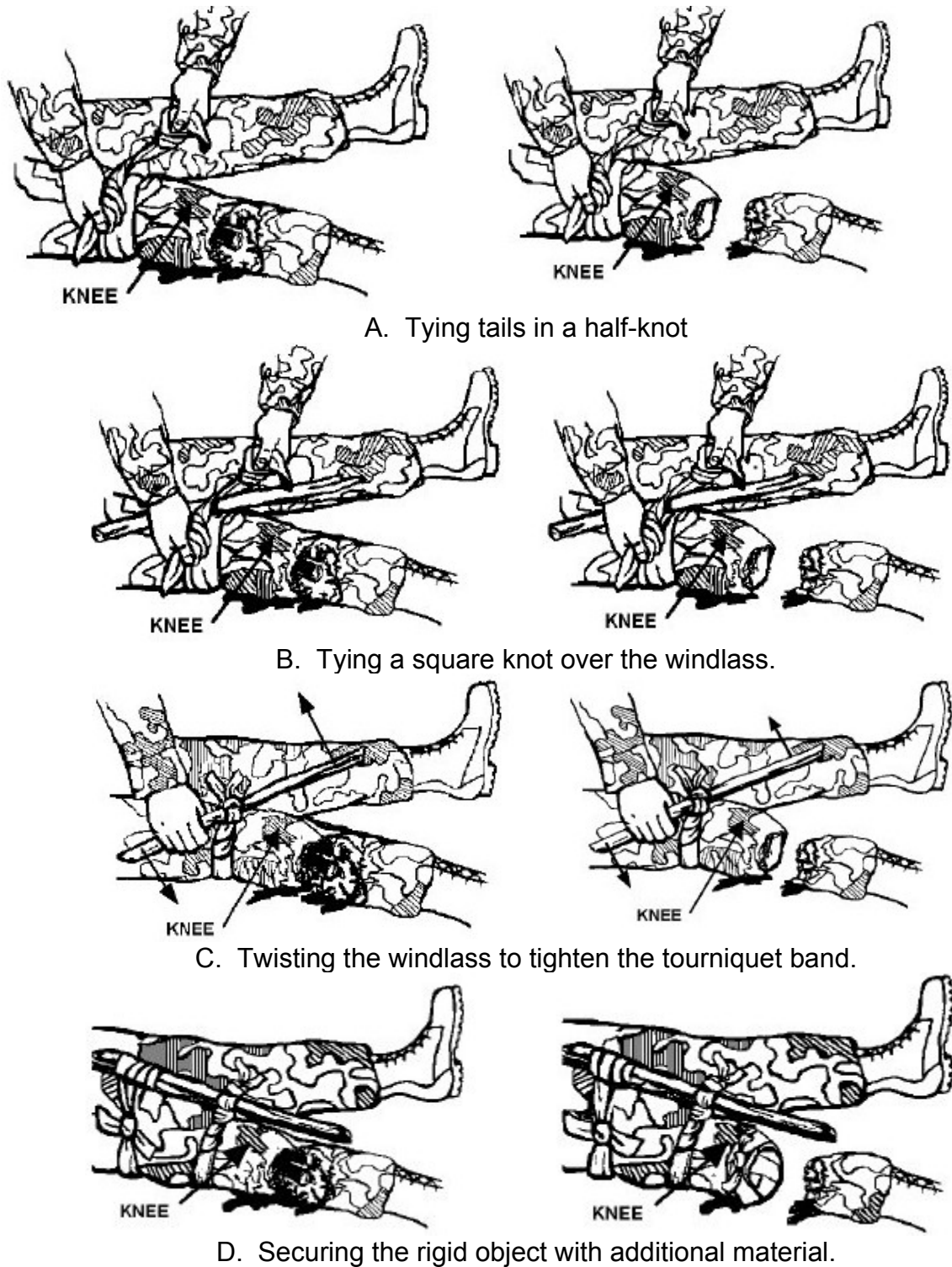


Figure 5-12. Applying an improvised tourniquet. (Left column shows severe bleeding from wound less than two inches below the knee; right column shows a complete amputation.)

(5) Twist the windlass (figure 5-12 C) either clockwise or counterclockwise until the tourniquet is tight and the bright red bleeding has stopped. Bright red blood is from a severed artery. Generally, darker blood is from a vein. Dark blood may continue to ooze even after the tourniquet has been properly applied. There should be no pulse below the tourniquet.

(6) Wrap a piece of material (cravat, torn strip of material, etc.) around the limb. Then wrap the ends of the material around one end of the windlass so that the tourniquet band will not unwind and tie the tails in a nonslip knot (figure 5-12 D).

**NOTE:** Tape or Kerlix™ bandage from the casualty's first aid kit can be used to secure the windlass.

## LESSON EXERCISES: LESSON 5

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. What is the leading preventable cause of death on the battlefield?

\_\_\_\_\_

2. The pad of material placed on the wound to absorb the blood is called the \_\_\_\_\_; the material used to keep the first pad of material from slipping off the wound is called the \_\_\_\_\_.

3. Why should you push away any loose clothing near a casualty's open wound before applying a field dressing?

- a. To allow the wound to get air.
- b. To provide a sterile work area.
- c. To see the extent of the wound.
- d. To apply ointment to the wound.

4. A casualty is bleeding from a wound in the leg. Part of the trouser material next to the wound is stuck to the wound. You should:

- a. Tear or cut around the stuck material so as to not pull the material from the wound.
- b. Gently pull the material from the wound area.

5. What part of the field first aid dressing should be applied directly over an open wound?
- a. Olive-drab tails.
  - b. Top side of the dressing (side to which tails are attached).
  - c. White side of the dressing.
  - d. Either side of the dressing.
6. When applying a field first aid dressing to a bleeding wound on the arm, the tails should be tied in a nonslip knot:
- a. Directly over the center of the wound.
  - b. Over the outer edge of the dressing.
  - c. On the other side of the arm (away from the wound).
  - d. Wherever the tails happen to cross.
7. You have just applied an emergency bandage to a wound on the casualty's arm. Under which of the following circumstances would you loosen the bandage?
- a. The bleeding has stopped.
  - b. The casualty has lost consciousness.
  - c. The casualty complains of thirst.
  - d. There is no pulse in the limb below (distal to) the bandage.
8. You have applied an emergency bandage to a bleeding wound on the casualty's forearm. The limb is not fractured. You should also apply \_\_\_\_\_  
\_\_\_\_\_ directly over the wound and \_\_\_\_\_ the arm.

9. You have applied a field first aid dressing, manual pressure, and elevation to a wound on the casualty's thigh, but blood is still leaking from the dressing. What should you do now?

---

10. When applying a pressure dressing on top of a field first aid dressing, the tails of the cravat should be tied:

- a. Directly over the wound.
- b. Over the outer edge of the dressing.
- c. On the other side of the arm (side opposite the wound).
- d. Wherever the tails happen to cross.

11. The portion of the limb below the emergency bandage is cool to the touch and the nail beds on the limb are bluish. The bandage should be \_\_\_\_\_ and \_\_\_\_\_. If the condition does not improve, \_\_\_\_\_ the casualty.

12. You are going to use digital pressure to help control severe bleeding from an open wound on the casualty's thigh. Use \_\_\_\_\_ to apply pressure to the pressure point at the front, center part of the crease in the groin in order to press the artery against the bone.

13. Which of the following is applied with the intent of stopping blood circulation?

- a. Emergency bandage.
- b. Manual pressure.
- c. Pressure dressing.
- d. Tourniquet.

14. Both you and the casualty are in a place of safety and you have sufficient time to treat the casualty. In which of the following situations, if any, would you apply a tourniquet without first trying to control the bleeding with an emergency bandage?
- Severe bleeding from a wound on the leg.
  - Severe bleeding from a wound on the forearm.
  - Amputation of the forearm four inches below the elbow.
  - None of the above.

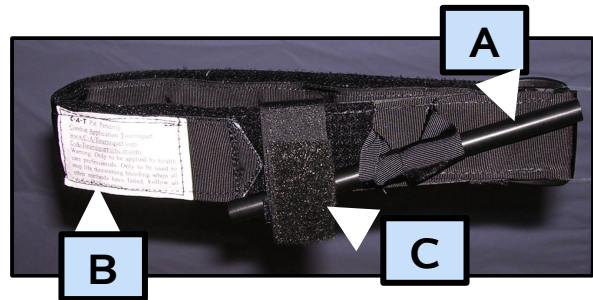
15. What is shown below? \_\_\_\_\_

Identify the three labeled parts.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_



16. When applying the CAT, the friction adaptor buckle is not necessary for proper application to a(n) \_\_\_\_\_, but it must be used as added protection when using two hands to apply the CAT to a(n) \_\_\_\_\_.
17. Which one of the following would be preferred for an improvised tourniquet band?
- A wire that is 36 inches long.
  - A square of cloth (about 36 inches on each side) cut diagonally and folded into a cravat.
  - A strong rubber band.
  - A bootlace.



18. You are going to apply an improvised tourniquet band made from a muslin bandage. The band should be at least \_\_\_\_\_ wide when folded.
- a. ½ inch.
  - b. 1 inch.
  - c. 1½ inches.
  - d. 2 inches.
19. If the amputation site is about one inch below the elbow joint, the tourniquet should be applied:
- a. Between the wound and the elbow.
  - b. Directly over the elbow.
  - c. Two inches above the elbow.
  - d. Two inches distal to the shoulder joint.
20. A soldier has just had his forearm amputated slightly above the wrist. The bleeding from the amputation site is not severe. What should you do first?
- a. Apply an emergency bandage to the wound.
  - b. Apply a tourniquet two inches above the amputation site.
  - c. Apply a tourniquet to the amputated body part.
  - d. Apply a tourniquet two inches above the elbow.

21. Which one of the following statements gives a proper rule for a tourniquet?
- a. A tourniquet should be loose enough so that you can slip two fingers under the tourniquet band.
  - b. A tourniquet should be loose enough so that you can slip the tip of one finger under the tourniquet band.
  - c. A tourniquet is to be tightened until the bright red bleeding has stopped; darker blood oozing from the wound can be ignored.
  - d. A tourniquet is to be tightened until both the bright red bleeding and the darker venous bleeding have stopped completely.
22. Once you have tightened an improvised tourniquet, you must:
- a. Secure the windlass so that the tourniquet band will not unwind.
  - b. Remove the windlass and tie the tails in a nonslip knot.
23. The lower part of the casualty's arm has been amputated. You have applied a CAT. How is the stump treated?
- a. The stump is dressed and bandaged.
  - b. The stump is left exposed to facilitate drainage.
24. You have applied a tourniquet to a casualty's left leg. Which one of the following is a proper method of marking the casualty?
- a. Write a "T" and the time of application on the casualty's forehead.
  - b. Write a "T" and the time of application on the dressing over the stump.
  - c. Write "LL" and the time of application on the casualty's forehead.
  - d. Write "LL" and the time of application on the dressing over the stump.
  - e. Write your initials on the casualty's chest.

25. You have controlled the bleeding from a wound on the casualty's thigh. The casualty lost a good deal of blood. Also, the casualty's skin appears to be pale, cool, and clammy. His is breathing faster than normal and he is acting agitated. The casualty is probably suffering from:
- a. Shock.
  - b. Cardiac arrest.
  - c. Hypothermia.
  - d. Blocked airway.
26. In most cases, the casualty's legs are placed on a stable object so that his feet are slightly higher than the level of his heart to help control shock. In which of the following circumstances would another position be used?
- a. The casualty has an open abdominal wound.
  - b. The casualty has an open chest wound.
  - c. The casualty is unconscious.
  - d. All of the above.
27. A casualty has a severe wound on the forearm, but the forearm is not fractured. Should you apply a splint to a forearm after you have controlled the bleeding with an emergency bandage?
- a. Yes.
  - b. No.
28. You are preparing a casualty with a tourniquet in place for evacuation. Should you cover the tourniquet with a blanket, poncho, or similar material to protect it from contamination by dirt and dust?
- a. Yes.
  - b. No.

29. You are applying an emergency trauma bandage to a wound on the limb. Indicate the order in which the following steps are performed by writing the numbers 1 (first) through 7 (last) in the blanks before the steps?

- \_\_\_ Insert the elastic bandage completely into the pressure bar.
- \_\_\_ Place the dressing pad on the wound.
- \_\_\_ Wrap the elastic bandage around the wounded limb.
- \_\_\_ Wrap the elastic bandage tightly over the pressure bar.
- \_\_\_ Secure the hooking end of the closing bar into the elastic bandage.
- \_\_\_ Continue to wrap the elastic bandage around the limb so that all edges of the pad are covered.
- \_\_\_ Pull the elastic bandage back over the top of the pressure bar, forcing the bar down onto the pad.

30. If possible, practice performing tasks listed below using the following checklists. It is recommended that you form a team of three -- one playing the role of the rescuer, one playing the casualty, and one performing the evaluation using the performance checklists provided.

Apply an emergency bandage to a wound on the arm or leg.

Apply a CAT to a wound on the arm or leg.

Apply an improvised tourniquet to a wound on the arm or leg.

If you cannot actually perform the task, perform it mentally. As you describe the steps you would go through, have a person using the checklist evaluate your performance.

## **SOLUTIONS TO LESSON EXERCISES: LESSON 5**

1. Bleeding (hemorrhaging) from an extremity (limb). (para 5-1)
2. Dressing; Bandage. (paras 5-2e, f)
3. c (para 5-3b)
4. a (para 5-3b(1))
5. c (para 5-14b(3))
6. b (para 5-14c(4))
7. d (paras 5-4j(1), (2))
8. Manual pressure; Elevate. (paras 5-5a, b)
9. Apply a pressure dressing. (para 5-15)
10. a (para 5-15c)
11. Loosened, reapplied, Evacuate. (paras 5-4j(2), (3))
12. The heel of your hand or your knee. (para 5-6b(2))
13. d (para 5-7)
14. c (paras 5-7b(1), (2))
15. Combat Application Tourniquet (CAT)  
A--Windlass  
B--Self Adhering Band  
C--Windlass strap. (figure 5-5)
16. Arm (upper extremity); Leg (lower extremity). (para 5-8e Note, figure 5-7j)
17. b (para 5-16a(1))
18. d (para 5-16)
19. c (para 5-8d Caution)
20. b (paras 5-7b(1), (2); 5-8d)

21. c (paras 5-8f, 5-17c(5))
22. a (para 5-16c(6))
23. a (para 5-10)
24. a (para 5-9)
25. a (para 5-11a)
26. d (paras 5-11b(1)(b), (c), (e))
27. a (para 5-11b(2)(b))
28. b (para 5-12a)
29.
  3. Insert the elastic bandage completely into the pressure bar.
    1. Place the dressing pad on the wound.
    2. Wrap the elastic bandage around the wounded limb.
    5. Wrap the elastic bandage tightly over the pressure bar.
    7. Secure the hooking end of the closing bar into the elastic bandage.
    6. Continue to wrap the elastic bandage around the limb so that all edges of the pad are covered.
    4. Pull the elastic bandage back over the top of the pressure bar, forcing the bar down onto the pad.  
(para 5-4)
30. See the following checklists.

## PERFORMANCE CHECKLIST

### APPLY AN EMERGENCY BANDAGE TO AN EXTREMITY

Situation: You have located a casualty (simulated) who is losing a good deal of blood from a wound on an extremity (wound is marked or indicated on arm, forearm, thigh, or leg).

Supplies: Emergency bandage.

	GO	NO-GO
Removes the emergency bandage from its pouch.	_____	_____
Places the pad (dressing) on the wound.	_____	_____
Wraps the elastic bandage around the extremity.	_____	_____
Inserts the elastic bandage completely into the pressure bar.	_____	_____
Pulls the elastic bandage back over the top of the pressure bar, forcing the bar down onto the pad.	_____	_____
Wraps the elastic bandage tightly over the pressure bar.	_____	_____
Continues to wrap the elastic bandage around the limb so that all edges of the dressing are covered.	_____	_____
Secures the hooking end of the closing bar into the elastic bandage	_____	_____
The bandage is tight enough to secure the dressing, but not tight enough to interfere with distal blood circulation.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step gives an overall evaluation of no-go.)	GO	NO GO

## PERFORMANCE CHECKLIST

### APPLY A COMBAT APPLICATION TOURNIQUET® TO AN EXTREMITY

Situation: You have decided to apply a Combat Application Tourniquet (CAT) to a casualty (wound/amputation site marked or indicated). Apply the CAT now and prepare the casualty for transport. However, do not tighten the tourniquet all the way. Tell the evaluator what you would do at that point, then continue as though the tourniquet band were tightened appropriately.

Supplies: Combat Application Tourniquet, marking device.

	GO	NO-GO
Removes the CAT from its pouch.	_____	_____
Slides the wounded extremity through the loop of the Self-Adhering Band.	_____	_____
Correctly positions the CAT about two inches above the wound.	_____	_____
Pulls the free running end of the Self-Adhering Band tight and securely fastens it back on itself. (The band does not adhere past the windlass clip).	_____	_____
[If leg, routes the Self Adhering Band through the fiction adaptor buckle.]	[ _____ ]	[ _____ ]
Twists the windlass rod until the bleeding has stopped. [Simulate if practicing on a person.]	_____	_____
Locks the rod in place with the windlass clip.	_____	_____
Secures the windlass rod with the windlass strap.	_____	_____
[If small extremity, secures the Self-Adhering Band under the windlass strap and continues to wind the Omni-Tape band around the extremity and over the windlass rod.]	[ _____ ]	[ _____ ]
Grasps the windlass strap, pulls it tight, and adheres it to the Velcro on the windlass clip.	_____	_____
Marks the casualty's forehead with a "T" and the time of application.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step gives an overall evaluation of no-go.)	<b>GO</b>	<b>NO GO</b>



## PERFORMANCE CHECKLIST

### APPLY AN IMPROVISED TOURNIQUET TO AN EXTREMITY

Situation: You have decided to apply an improvised tourniquet to a casualty (wound/amputation site marked or indicated). Apply the tourniquet now and prepare the casualty for transport. However, do not tighten the tourniquet all the way. Tell the evaluator what you would do at that point, then continue as though the tourniquet band were tightened appropriately.

Supplies: Triangular bandages (or other material appropriate to make a cravat and secure the rigid object), windlass (stick), tape, marking device.

	GO	NO-GO
Makes a band (cravat) at least two inches wide.	_____	_____
Wraps the tourniquet band around the limb two to four inches above the wound.	_____	_____
Ties a half-knot.	_____	_____
Places the rigid object (stick) on top of the half-knot.	_____	_____
Ties a full knot over the rigid object.	_____	_____
Twists the stick to tighten the tourniquet. [Simulate if practicing on a person.]	_____	_____
Secures the windlass to prevent tourniquet from untwisting using strip of cloth, cravat, or tape wrapped around the limb. If a cravat or strip of cloth is used, the tails are tied in a nonslip knot.	_____	_____
Marks the casualty's forehead with a "T" and the time of application.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step gives an overall evaluation of no-go.)	<b>GO</b>	<b>NO GO</b>



## **LESSON ASSIGNMENT**

### **LESSON 6**

Splinting Fractures.

### **LESSON ASSIGNMENT**

Paragraphs 6-1 through 6-12.

### **LESSON OBJECTIVES**

After completing this lesson, you should be able to:

- 6-1 Identify signs and symptoms of a fracture.
- 6-2. Identify the procedures for locating the site of a suspected fracture.
- 6-3. Identify the procedures for applying a splint to a suspected fracture of the extremity.
- 6-4. Identify the procedures for applying a sling and swathe to a suspected fracture of the upper extremity.
- 6-5. Identify the procedures for treating dislocations, sprains, and strains.
- 6-6. Identify the procedures for treating a suspected spinal fracture.

### **REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
TRADOC Pamphlet 600-4, IET Soldier's Handbook.  
Training Support Package 071-D-2319 / First Aid 4  
(Splint a Suspected Fracture)

### **SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 6

### SPLINTING FRACTURES

#### 6-1. BONES

a. The bones of your body form your skeleton. The skeleton forms the framework of your body. The bones that form the ribcage and the pelvis act to protect internal organs such as the heart, lungs, and intestines. The skull protects the brain. The spine (backbone) protects the spinal cord, a system of nerves that sends messages from the brain to all parts of the body and transmits messages from all parts of the body to the brain.

b. Muscles are attached to bones by tendons. These muscles contract and relax, causing your bones to move. This allows you to sit, stand, run, turn your head, pick up an object with your fingers, and so forth.

c. When two bones meet, they form a joint. The ends of the bones are covered with cartilage, which prevents the bones from actually rubbing against each other. The bones are connected to each other by ligaments. Most joints are mobile (allow movement). For example, your arm and forearm meet at the joint known as the elbow. Some joints are relatively fixed, such as those in your coccyx (tailbone) and skull.

d. Bones are surrounded by blood vessels and nerves. When a bone is fractured (broken), damaged nerves and blood vessels cause pain and loss of blood.

#### 6-2. TYPES OF FRACTURES

A fracture occurs when a bone is broken. The break may only be a crack in the bone (incomplete fracture) or the bone may be broken into two separate parts (complete fracture). Any fracture can be serious. A fracture of a large bone like the femur can result in a significant loss of blood that, in turn, can result in hypovolemic shock. Complete fractures are also dangerous because the sharp ends of the fractured bone can injure muscle tissues, nerves, and blood vessels. A fracture can cause discomfort, disability, and even death. An incomplete fracture is treated as though it were a complete fracture. Fractures are usually classified as open or closed.

a. **Closed Fracture.** A closed fracture (figure 6-1 A) is a fracture in which the skin is not broken. A closed fracture may result in significant loss of blood due to internal bleeding (bleeding into surrounding body tissues or into a body cavity) even though no blood is visible.

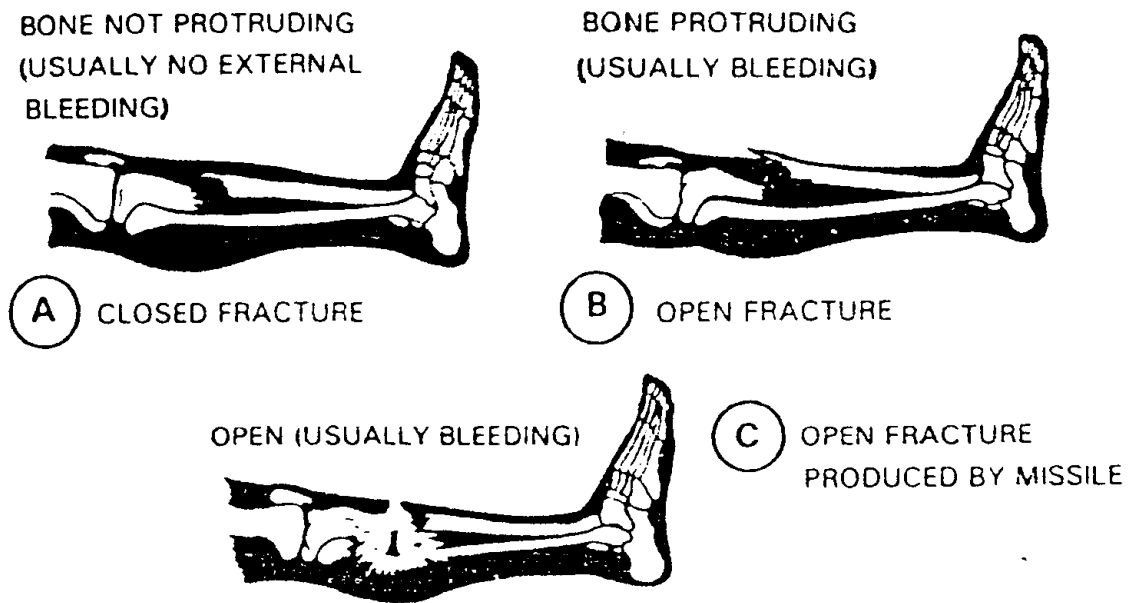


Figure 6-1. Examples of fractures.

b. **Open Fracture.** An open fracture is one in which the skin is broken (penetrated). The source of the penetration may have been the sharp end of a fractured bone (figure 6-1 B) or a foreign object such as a bullet which penetrated the skin and fractured the bone (figure 6-1 C). If an open wound is caused by a fractured bone, the bone may remain visible or it may slip back below the skin and muscle tissues. An open fracture results in more blood loss than does a closed fracture since the blood can escape through the open wound. In addition, infection is a major concern.

### 6-3. COMMON CAUSES OF FRACTURES

Fractures may be caused by a direct blow to the body (such as being hit by a vehicle) or by indirect force that results in a fracture away from the point of impact (such as a hip fracture resulting from a person landing on his knee after a hard fall). A fracture can also result from a limb being twisted or even from powerful muscle contractions during a seizure. Fatigue (stress) fractures can result by repeated stress, such as a stress fracture of the foot during a long march. Certain diseases can weaken bones and make them easier to break. High-energy impacts, such as being hit by a speeding vehicle or by a bullet, may produce multiple fractures and cause severe damage to surrounding tissues. Falls are a common cause of fractures.

## 6-4. SIGNS AND SYMPTOMS OF FRACTURES

A fracture may be found when evaluating the casualty. Life-threatening injuries (lack of breathing and severe bleeding) should be treated first since they immediately threaten the casualty's life. A serious fracture, however, can also be life-threatening. A fracture can be identified by the following signs and symptoms.

**NOTE:** A sign is something that can be observed by someone other than the casualty. Bleeding, bruises, and pulse rates are examples of signs. A symptom is something which the casualty senses, but which cannot be observed directly by another person. Pain is an example of a symptom.

a. **Visible Fracture.** In an open fracture, the fractured bone or bone fragments may be visible.

b. **Deformity.** The body part may appear deformed due to the displacement of the bone, the unnatural position of the casualty, or angulation where there is no joint (for example, the casualty's forearm is "bent" instead of straight).

c. **Pain.** The casualty will probably experience pain at a particular location. The pain (point tenderness) usually identifies the location of the fracture. The casualty may be able to "feel" the fractured bones.

d. **Swelling.** There may be swelling (edema) at the suspected fracture site.

e. **Discoloration.** The area around the suspected fracture site may be bruised or have hemorrhagic spots (ecchymosis).

f. **Crepitation.** The fracture bones may make a crackling sound (crepitation) if they rub together when the casualty moves.

**CAUTION:** Do not ask the casualty to move the injured body part in order to test for crepitation.

g. **Loss of Motion.** The casualty may not be able to move the injured limb or have difficulty in moving the limb. If a spinal injury is present, paralysis may exist, especially paralysis of the legs.

**NOTE:** Do not have the casualty attempt to move the injured arm or leg to test this symptom. Rely upon what the casualty tells you.

h. **Loss of Pulse.** If the fractured bone is interfering with blood circulation, there may be no pulse distal to (below) the site of the fracture.

i. **False Motion.** There may be motion at a point where there is normally no motion. This movement at the fracture site is called false motion.

j. **Massive Injury.** There may be massive injury to an arm or leg accompanying the fracture.

k. **Snap.** A "snapping" sound may have been heard by the casualty at the time of the injury.

## **6-5. TREATING A SPINAL FRACTURE**

Injury to the spine may cause paralysis and even death. Unless an immediate, life-threatening danger is present (fire, explosions, and so forth), you should **not** move a casualty with a suspected back or neck injury. Immobilize the casualty to prevent movement of his back and neck and seek medical help for the casualty. Treat any casualty which you think may have a spinal injury as though you were certain that he had a fractured spine.

a. **Recognize a Possible Spinal Injury.** Signs and symptoms of an injured spine include:

- (1) Pain or tenderness of the neck or back.
- (2) Cut or bruise on the neck or back.
- (3) Inability to move part of the body (paralysis), especially the legs.
- (4) Lack of feeling in a body part. (Touch the casualty's arms and legs and ask if he feels your hand.)
- (5) Loss of bladder and/or bowel control.
- (6) Head or back in an unusual position.

b. **Seek Medical Help.** Send someone to seek medical help, usually the combat medic. Special supplies, such as a spine board, should be used to prepare the casualty for evacuation.

c. **Immobilize the Suspected Fracture.**

(1) Tell the casualty to keep still. Any movement could cause additional injury.

(2) If the casualty is lying on his stomach, keep him from moving until medical help arrives. If the casualty is lying on his back, use padding to help immobilize his back, neck, and head as described below.

(a) Roll or fold padding (such as a blanket) so that it conforms to the shape of the arch of his back. Then carefully slide the padding under the arch of his back. This padding will help to support and immobilize his back.

(b) Prepare and slide a roll of cloth under the casualty's neck to help support and immobilize his neck. Figure 6-2 illustrates padding supporting a casualty's back and neck.

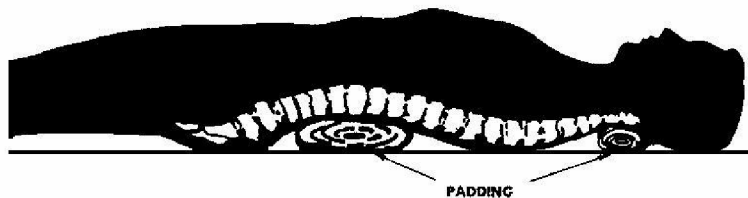


Figure 6-2. Padding placed under a casualty's back and neck.

(c) Place padded rocks, small padded logs, or filled boots on each side of the casualty's head to keep it from moving (figure 6-3). Filled boots are prepared by removing the casualty's boots, filling the boots almost to the top with sand or small rocks, place material (strip of clothing, sock, etc.) on top of the sand or rocks, and tying the top of the boots to keep the material and filler from coming out.

**CAUTION:** Do not remove the casualty's boots if you are in a chemical environment.

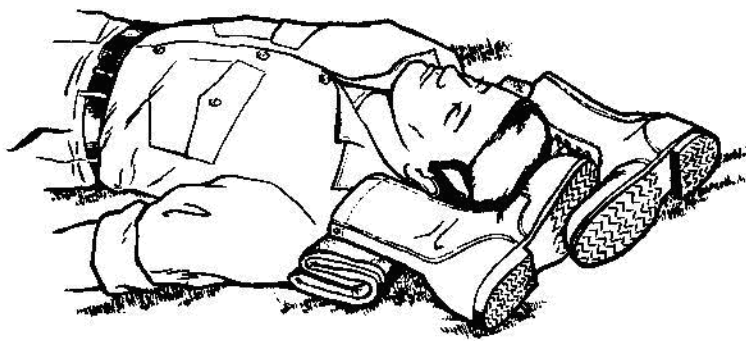


Figure 6-3. Using filled boots to immobilize a casualty's head and neck.



## 6-6. PREPARING TO SPLINT A FRACTURE OF AN EXTREMITY

Once you have located the site of the fracture, you must splint the injured arm or leg. If the fractured bone is not splinted, the sharp end of the broken bone could move and injure surrounding muscles, blood vessels, and nerves. Before applying the splint, however, you should prepare the casualty.

a. **Reassure the Casualty.** Tell the casualty that you are taking care of him. If you must leave the casualty to obtain materials for a splint, be sure to tell him that you will return quickly. Talk to the casualty even if he appears to be unconscious.

b. **Loosen Clothing and Expose Wound.** Loosen any clothing that is tight or which binds the casualty. Gently move clothing to expose the injury and to determine the site of the fracture.

**CAUTION:** In a chemical environment, do not loosen or remove any protective clothing. Apply any needed dressings over the casualty's clothing.

c. **Locate the Site of the Fracture.** If the fracture is open, the wound (with or without visible bone) usually identifies the site of the fracture. In a closed fracture, pain, point tenderness, bruising, swelling, deformity, and crepitation may be used to locate the site of the fracture.

d. **Remove Jewelry.** Remove any jewelry that is on the casualty's injured limb and put the jewelry into his pocket. Jewelry is removed because the limb may swell and cause the jewelry to interfere with blood circulation. If this happens, the jewelry may have to be cut off to restore adequate blood circulation. Be sure to tell the casualty what you are doing and why.

e. **Check Circulation Below the Fracture Site.** Evaluate the casualty's blood circulation in the limb below the fracture site. A person with poor circulation should be evacuated as soon as possible after the limb is splinted to prevent the loss of the limb.

(1) Check pulse. Palpate a pulse site below the fracture site. If no pulse or a weak pulse is found, the fracture may be putting pressure on the artery or may have damaged the artery. A weak pulse can be determined by comparing the pulse felt below the fracture with the pulse felt at the same location on the uninjured limb. A casualty with no pulse below the fracture site should be evacuated as soon as the limb is splinted.

(2) Check capillary refill. If the fractured limb is an arm, press on the casualty's fingernail, then release. If normal color does not return within two seconds, the limb may have impaired circulation. This is also called the blanch test.

(3) Check skin temperature. Place your hand on the area beneath the injury. Then place your hand on the corresponding area on the uninjured arm or leg. If the skin of the injured limb is cooler than the skin on the uninjured limb, the casualty probably has poor circulation in the injured limb.

(4) Check sensation. Ask a conscious casualty if he can feel your touch. Then lightly touch an area below the fracture. (If his arm is fractured, for example, touch the tip of the index and little fingers on the injured arm.) Ask the casualty if the injured limb feels numb or has a tingling sensation. If the area feels numb or tingling to the casualty, the area probably has poor circulation.

(5) Check skin color. In a light-skinned person, a pale, white, or bluish-gray skin color indicates poor circulation. To check the circulation in a dark-skinned individual, press on a nail on the injured limb and the corresponding nail on the uninjured arm or leg. Release both nails at the same time. If the color returns to the nail bed of the uninjured limb faster than it returns to the nail bed of the injured limb, the casualty probably has poor circulation in the injured limb.

(6) Check motor function. Ask a conscious casualty to try opening and closing the hand of an injured arm or moving the foot of an injured leg. If the attempt produces pain, have the casualty stop his efforts.

(7) Question casualty. Ask the casualty if the limb feels numb, cold, or unusual (tightness). These are symptoms of poor circulation.

f. **Dress Wounds.** Dress any open wounds on the injured limb before applying the splint. If a bone is sticking out, do not attempt to push the bone back under the skin. Apply the dressing over the bone and the wound. Do not attempt to straighten or realign the injured limb.

g. **Obtaining Splinting Material.** Gather the materials you will need to make the splint. You will need something to use as rigid objects, padding, and securing materials.

(1) Rigid objects. Tree branches, poles, boards, sticks, unloaded rifles, or other rigid objects can be used. Normally, two rigid objects (one for each side of the limb) are used. The rigid objects should be fairly straight and be long enough to extend beyond the joint above the fracture site and beyond the joint below the fracture site. Even the casualty's own body can be used when other materials are not available. His chest can be used to immobilize a fractured arm and an uninjured leg can be used to immobilize a fractured leg.

(2) Padding. Blankets, jackets, ponchos, extra clothing, shelter halves, or leafy plants can be used to pad the splint. In some cases, you may have to use the casualty's trouser leg or shirt sleeve as padding. Padding is necessary to keep the rigid object from rubbing against the skin on the injured limb. It can also help to prevent the end of the rigid object from pressing against an area on the casualty's body containing major blood vessels.

**NOTE:** If a SAM (splint, aluminum, malleable) universal splint is used, additional padding is not needed since the splint is coated with a synthetic padding.

(3) Securing materials. Rigid objects can be secured with strips of clothing, belts, pistol belts, bandoleers, cravats, or similar materials. The securing materials keep the rigid objects and padding in place. Cravats are preferred when possible. Narrow materials such as wire and cord should not be used to secure the rigid object in place since they could interfere with blood circulation. The steps for making cravats were given in Lesson 5.

## **6-7. SPLINTING THE FRACTURED EXTREMITY**

**NOTE:** Even if the arm or leg is not broken, the pain caused by a wound may be lessened if the arm or leg is splinted after it has been dressed and bandaged.

### **a. Position the Securing Material.**

(1) Push the securing material (cravat, etc.) under natural body curvatures, such as the knee. Then gently move the securing material up or down the limb until the material is in proper position.

(2) Place securing material under the limb both above and below the fracture site. If possible, place two cravats above the fracture site and two cravats below the fracture site (above the upper joint, between the upper joint and the fracture, between the fracture and the lower joint, and below the lower joint.)

**CAUTION:** Do not place securing material directly under the suspected fracture site. The pressure caused by the securing material when it is tightened could cause additional injury to the fracture site.

**b. Position the Rigid Objects.** Place the rigid objects over the securing material so that one rigid object is on each side of the injured limb. When possible, position the rigid objects so that the joint above the fracture and the joint below the fracture can be immobilized. If the fracture is in the lower leg, for example, the splint should extend above the knee and below the ankle. (Note: If a forearm is fractured, the wrist is usually immobilized by the splint and the elbow is usually immobilized by a sling and swathe.) Make sure that the ends of the rigid objects are not pressing against a sensitive area such as the armpit or groin. Pressure on these areas can interfere with blood circulation.

c. **Apply Padding.** Place padding between the rigid objects and the body part to be splinted. The padding helps prevent excessive pressure on the limb which could interfere with blood circulation. Extra padding should be used at bony body areas such as the elbow, wrist, knee, or ankle and extra-sensitive areas such as the groin and armpit.

**SPECIAL NOTE:** As a general rule, fractures are splinted in the position they are found ("splint them as they lie"). However, if there is no circulation below the fracture site or if the limb is so grossly angulated that you cannot effectively splint it, you may need to gently realign the limb. With one hand supporting the fracture site, use the other hand to grasp the part of the limb farthest from the fracture site and gently pull in the direction of the long axis of the bone, like extending a telescope. The realignment of the limb may help to restore blood circulation.

d. **Secure Rigid Objects and Padding.** Wrap the securing materials around the rigid objects and limb so that the rigid objects immobilize the limb. Tie the ends (tails) of each securing cravat in a nonslip knot on the outer rigid object and away from the casualty. (The knots are tied on the outer rather than the inner rigid object to make loosening and retying the cravats easier should that procedure become necessary.) The securing material should be tight enough to hold the rigid objects and padding securely in place, but not tight enough to interfere with blood circulation. Properly secured splints cannot be moved easily.

(1) Secure the rigid objects above and below the fracture site (normally, two cravats above the fracture site and two cravats below the fracture site). Normally, the joint above the fracture site and the joint below the fracture site are immobilized.

(2) If a joint is fractured, apply the splint to the bone above the joint and to the bone below the joint so the joint is immobilized.

(3) Pad the splint at the joints and at sensitive areas to prevent local pressure.

(4) If possible, immobilize the joint above the fracture site and the joint below the fracture site.

(5) Minimize movement of the limb until it has been splinted.

**NOTE:** Figures 6-4 through 6-12 show splints applied to upper and lower extremities.

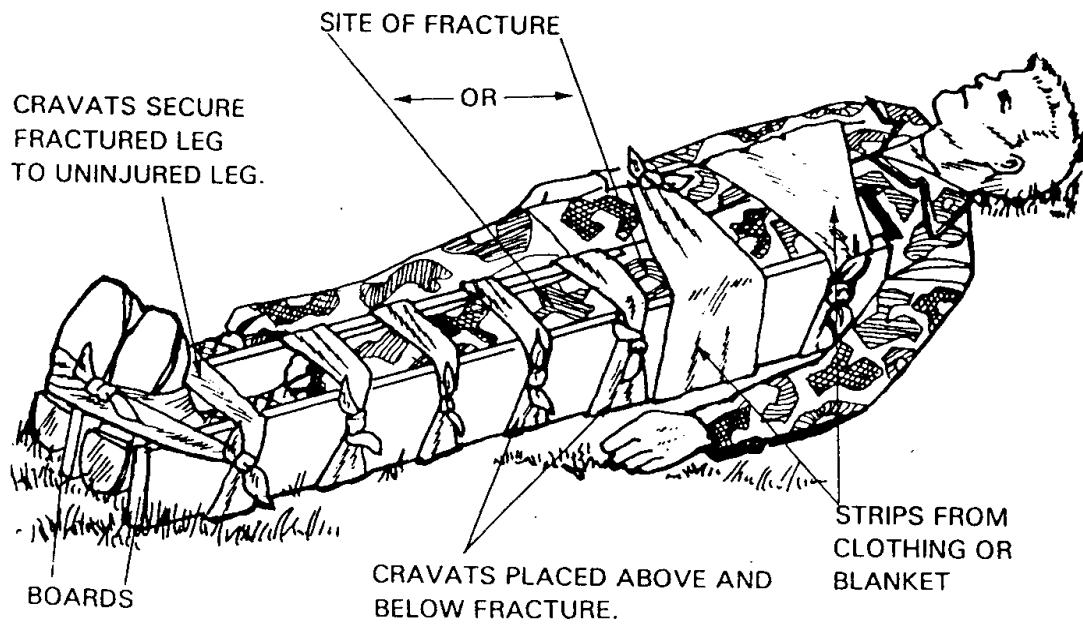


Figure 6-4. Splint applied to a fractured femur (thigh).

CRAVAT TO SECURE ANKLE (PLACED UNDER SPLINT, CROSSED ON TOP OF BOOT, CROSSED ON SOLE OF BOOT, TIED ON TOP OF BOOT).

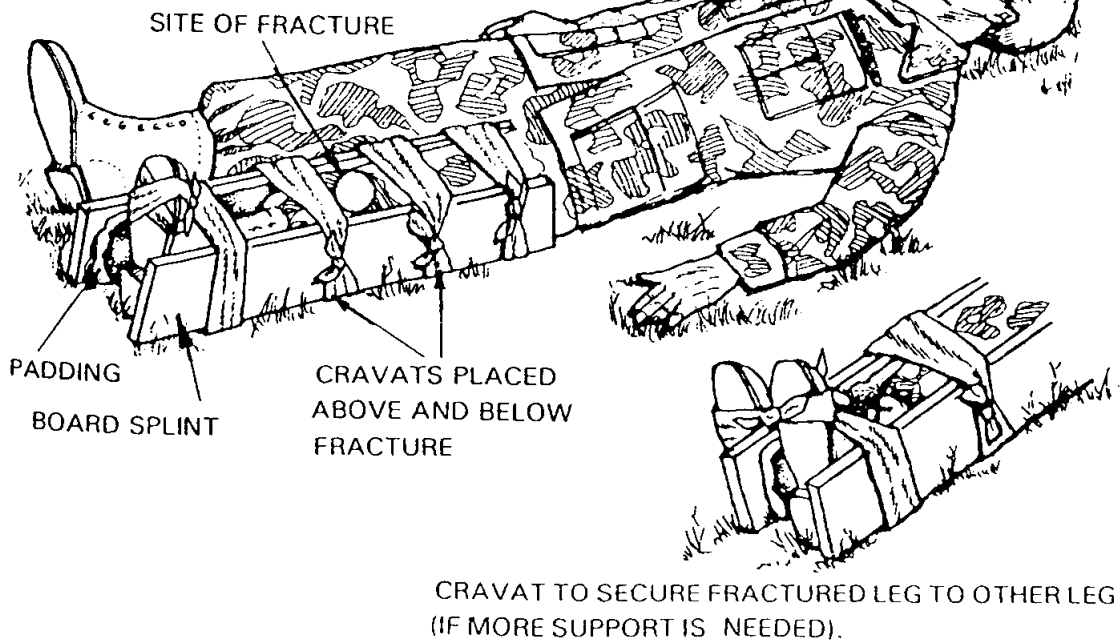


Figure 6-5. Splint applied to a fractured tibia or fibula (leg)

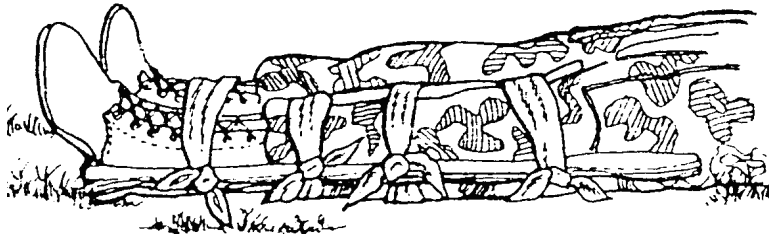


Figure 6-6. Tree limbs used to splint a lower leg.

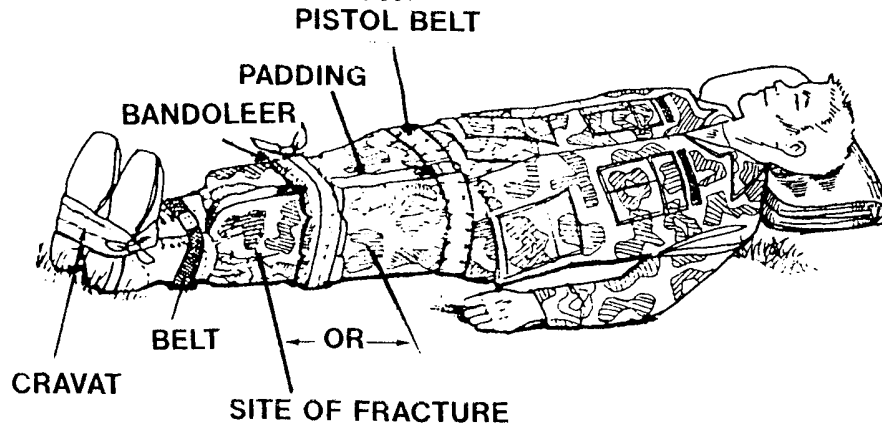


Figure 6-7. Uninjured leg used as a rigid object (anatomical splint).

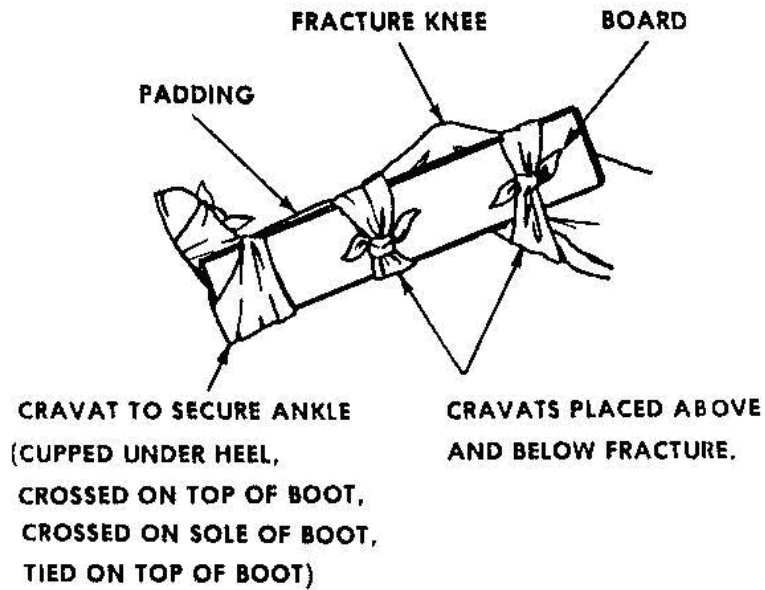


Figure 6-8. Splint applied to a knee.

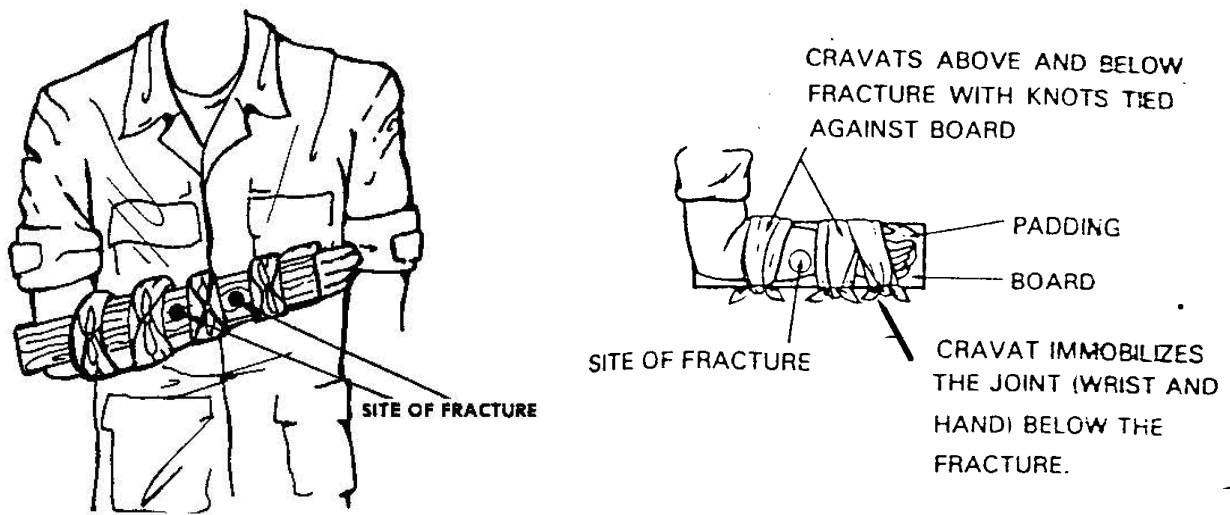


Figure 6-9. Splints applied to fractured forearms.

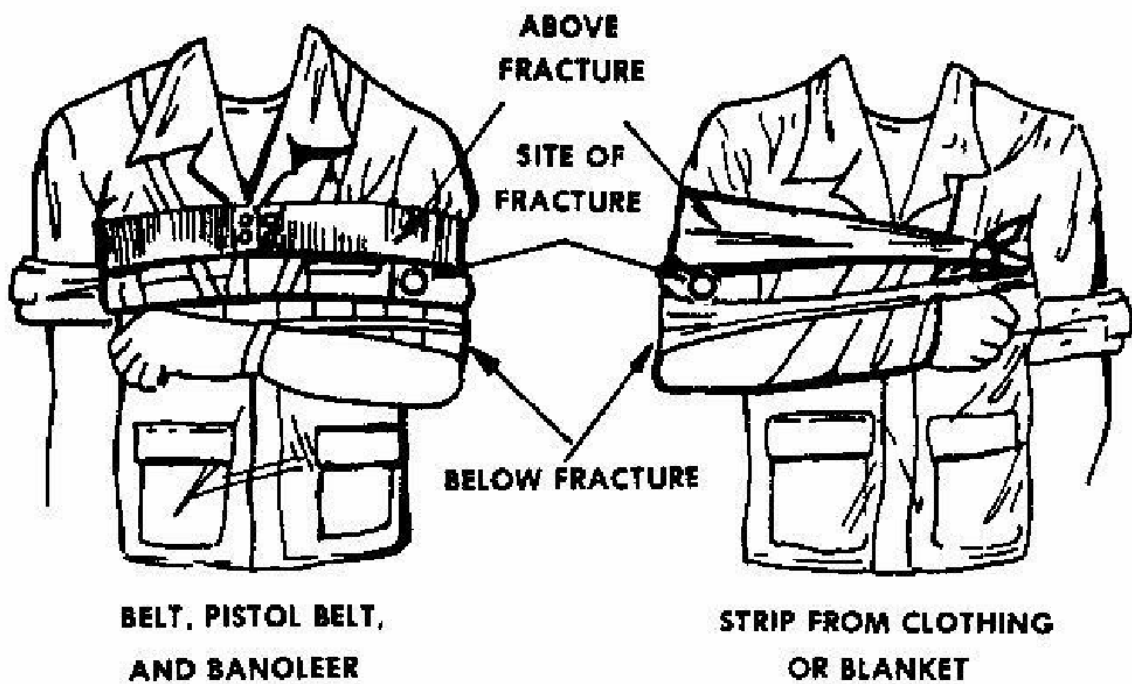


Figure 6-10. Chest used as a rigid object to splint a fractured upper arm (anatomical splint). (Note that the sling is applied before the swaths.)

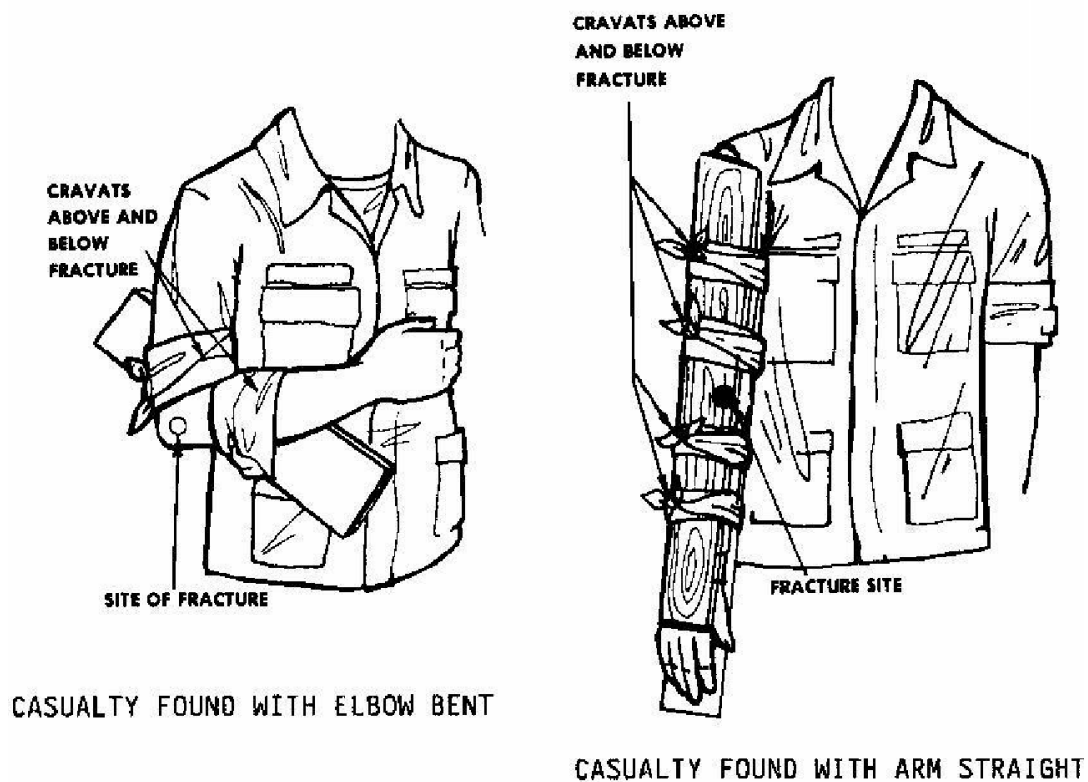


Figure 6-11. Splint applied to a fractured elbow.

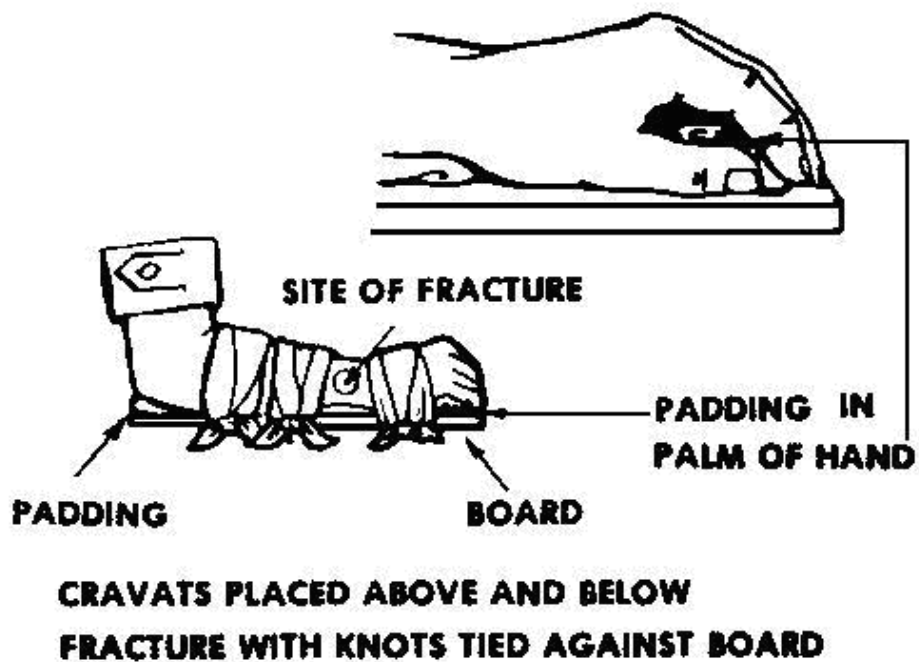


Figure 6-12. Splint applied to a fractured wrist.



e. **Recheck Circulation.** Observe the limb below the cravats for signs of impaired circulation as you secure the splints. After the splint has been secured, recheck the limb's circulation to ensure that the cravats or rigid objects have not interfered with blood circulation. Check the color and temperature of the limb and ask the casualty how the limb feels. If your check before splinting the fracture showed normal circulation and your check now shows poor circulation (weak or no pulse, bluish skin, slow return of color to nail bed, coolness, a numb or tingling sensation in the limb, etc.), take the following measures to restore circulation.

(1) Loosen the securing strip/cravat closest to the heart (above the fracture site).

(2) If the end of the rigid object is pressing against the casualty's body (especially under the arm or inside the thigh), reposition the rigid object and/or add padding.

(3) Retie the securing materials using nonslip knots on the outer rigid object. Make sure that the securing materials keep the rigid objects from slipping, but are not tight enough to interfere with blood circulation.

(4) Recheck the circulation. If the limb still has poor circulation, repeat steps (1) through (4) for the next cravat/securing strip (one distal to the previous cravat) until circulation is restored or until all of the securing materials have been loosened and retied.

(5) If all of the securing materials have been loosened and retied and the circulation has not been restored, evacuate the casualty as soon as possible.

## **6-8. APPLYING A SLING TO A FOREARM**

A sling is used to support and immobilize the forearm. It also serves to immobilize the elbow and upper arm. A sling is normally made from a triangular bandage (see Lesson 5), but other slings can be improvised. A swathe is normally applied to further immobilize the casualty's injured arm.

a. Insert the triangular bandage (figure 6-13 A) between the injured arm and the casualty's chest so the arm is in the center, the apex of the sling is beyond the elbow, and the top corner of the material is over the shoulder of the injured side (figure 6-13 B).

b. Position the forearm so the hand is slightly higher than the elbow (about a 10 degree angle).

c. Fold the material along the base (the long side opposite the apex) back to the casualty's fingers, forming a cuff.

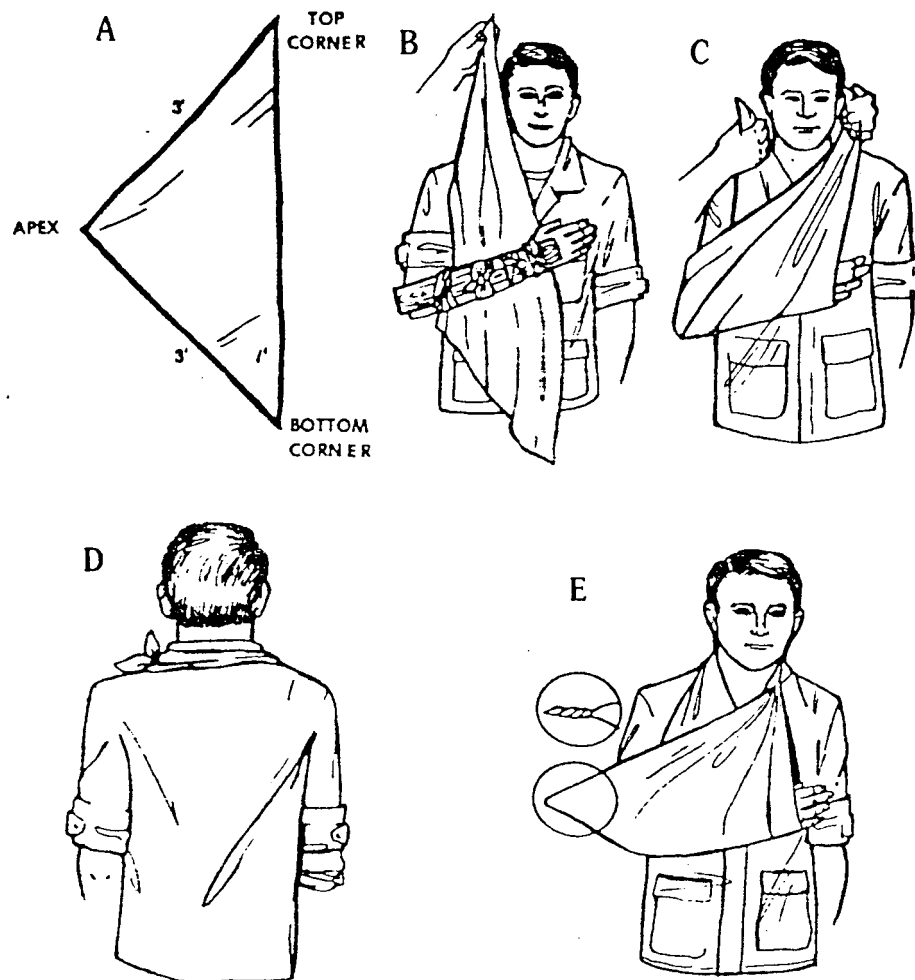


Figure 6-13. Applying a triangular bandage sling to a fractured forearm.

- d. Bring the lower portion of the material over the injured arm so the bottom corner goes over the shoulder of the uninjured side (figure 6-13 C). The elbow should be inside the sling.
- e. Bring the top corner behind the casualty's neck.
- f. Tie the two corners together in a nonslip knot at the "hollow" at the neck on the uninjured side (figure 6-13 D). If the casualty's right arm is fractured, for example, tie the knot so it will rest in the hollow on the left side of his neck.
- g. Secure the apex of the sling to keep the elbow and forearm from slipping out of the sling. Twist (pigtail) the apex of the sling and tuck it in at the elbow (figure 6-13 E).

**NOTE:** Although the previous instruction used a triangular bandage as a sling, any nonstretching material, such as the tail of a coat or shirt or pieces of cloth torn from clothing or blankets, can be used. Figure 6-14 shows a jacket being used to make a sling. A stick or other rigid object is pushed through the flap and the upper portion of the jacket so the flap will not slip.



Figure 6-14. Jacket flap sling.

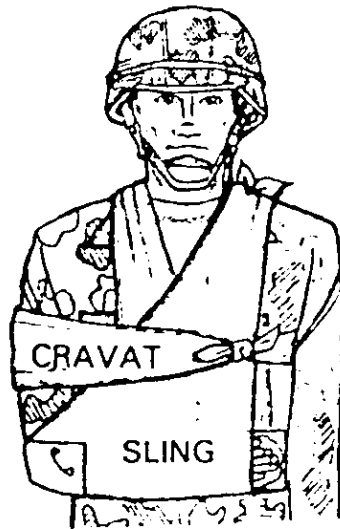
## 6-9. APPLYING A SWATHE TO A FRACTURED ARM

a. A swathe is usually used to immobilize the arm against the casualty's body wall so that the arm does not move easily. The swathe is applied to help prevent additional injury to the arm or forearm. A large strip of cloth, blanket strip, pistol belt, trouser belt, bandoleer, or other material can be used as a swathe. The swathe should be three to six inches wide.

b. When a swathe and sling are used to immobilize a forearm, the sling is applied first, such as shown in figure 6-15.

**CAUTION:** Do not apply a swathe on top of the fracture site. The pressure of the swathe could cause additional damage to the nerves and blood vessels around the broken bone.

c. Swathes are also used to secure a fractured leg to an uninjured leg (anatomical splint).



Note that the swathe (cravat) is applied over the sling and immobilizes the joint (elbow) above the fracture site. Also, a safety pin is used to secure the apex of the sling instead of the pigtail method.

Figure 6-15. Sling and swathe applied to a splinted forearm.

d. To apply a swathe:

(1) Place one end of the swathe on the sling at the breast pocket near the uninjured arm. Hold this end at this location.

(2) Wrap the other end of the swathe across the sling (if used), around the upper arm on the injured side, behind the casualty's back, under the uninjured arm, and back to the breast pocket.

(a) You have now encircled the casualty's chest and injured arm. The uninjured arm, however, remains free to move.

(b) If the fracture is in the forearm and not the upper arm, make the swathe wide (about 12 inches) when it goes across the injured arm.

(c) If the casualty has a fractured humerus (upper arm), do not make the swathe as wide since the swathe should not be over a fracture site. If possible, apply two swathes--one above the fracture site and one below the fracture site.

(3) Tie the two ends of the swathe in a nonslip knot over the breast pocket on the uninjured side.

(4) Check the casualty's pulse below the swathe. If the casualty had a pulse before the swathe was applied but the pulse is no longer present, loosen and retie the swathe. If a pulse is still not present, evacuate the casualty as soon as possible.

e. Examples of swathes applied to upper extremities are shown in figure 6-16.

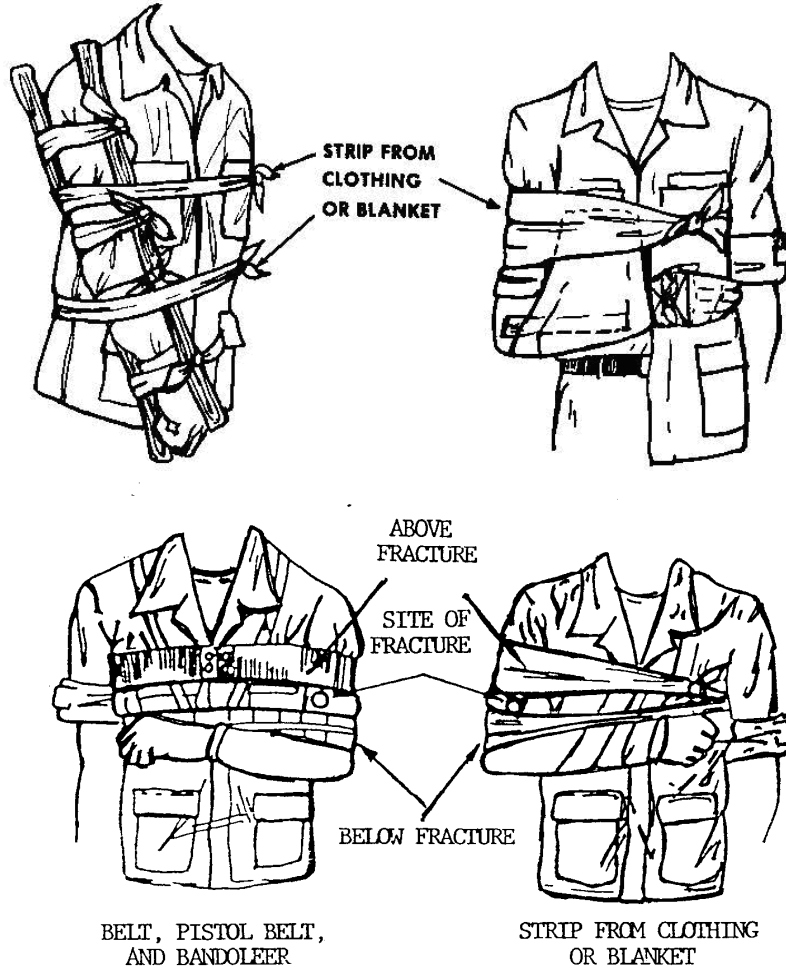


Figure 6-16. Swathes applied to immobilize an injured arm or forearm.

## 6-10. DISLOCATIONS

A dislocation occurs when the bones comprising a joint (elbow, knee, wrist, etc.) are forced out of their proper positions. The ligaments that hold the ends of the bones together may be torn. Other tissues surrounding the joint may also be injured. Joints frequently affected include the shoulder, elbow, fingers, hips, and ankles.

a. **Signs and Symptoms.** A dislocation results in a deformed appearance due to the bone being out of its normal position (see figure 6-17). A dislocation also causes pain and/or a feeling of pressure over the joint. The region around the joint usually swells and is tender. The casualty may not be able to move the joint (the joint is "locked"). If the end of the dislocated bone is pressing on a nerve or blood vessel, the casualty may experience numbness or paralysis distal to (below) the injury.

**CAUTION:** Do not ask the casualty to move the injured body part in order to test for a locked joint or pain.

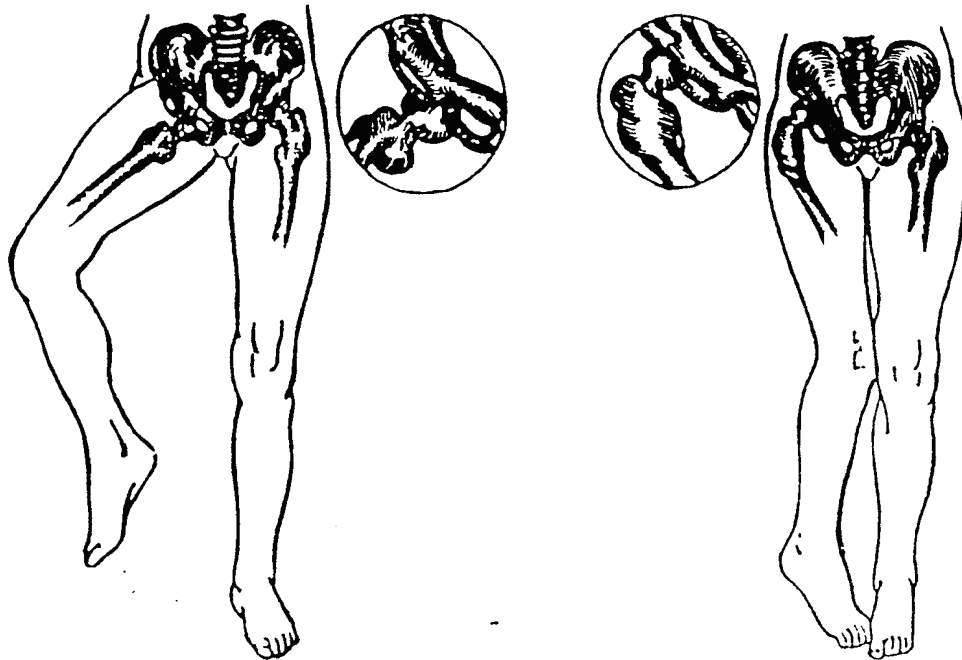


Figure 6-17. Casualty with a dislocated hip.(anterior dislocation on left, posterior dislocation on right)

b. **Treatment.** Treat a dislocation as though it were a closed fracture.

(1) Check for pulse and sensation distal to the injury. If there is no pulse or if the casualty has no feeling distal to the injury, get medical help at once. A medic may be able to restore blood circulation by gentle manipulation of the limb.

(2) Immobilize (splint) the joint in the position in which it was found. Do not attempt to straighten the affected limb or put the bones back in alignment. Splint a dislocation using the same procedures as for a closed fracture. If the shoulder is dislocated, use a sling to support the forearm.

(3) Reduce swelling by elevating the joint and applying cold (a cold pack or ice compress), if available, for the first 24 hours after the musculoskeletal injury. After 24 hours, heat or warm soaks should be used to facilitate blood circulation to the injured area.

## 6-11. SPRAINS

A sprain results when the ligaments connecting two bones are stretched or torn. Other tissues surrounding the joint may also be damaged. A sprain usually results when a joint is suddenly twisted beyond its normal range of motion. Skiing accidents often result in sprains. Sprains are most common in the knees and ankles. A sprain can result from a temporary dislocation in which the bones resume their normal position following the injury. A sprain may produce as much damage as a dislocation.

a. **Signs and Symptoms.** A sprain does not cause a deformed appearance since the bones are not out of their normal positions. A sprain causes pain (tenderness), swelling, and discoloration (bruise) at the injured joint. The casualty may be unable to move the joint due to pain.

**CAUTION:** Do not ask the casualty to move the injured body part in order to test for joint pain or immobility.

b. **Treatment.** Treat the sprain as though it were a closed fracture.

(1) Immobilize the joint.

(2) Reduce swelling by elevating the joint and applying cold, if available, during the first 24 hours following the injury. After this time, apply warmth to promote blood circulation to the injured area.

## 6-12. STRAINS

A strain is a stretching or tearing of the muscle tissues around a joint. It is usually caused by excessive effort such as overstretching or overexertion. It is commonly called a "muscle pull."

a. **Signs and Symptoms.** A strain does not result in a deformed appearance. Swelling may or may not be present. Muscle spasms may be present. A strain can cause pain when the joint is moved.

b. **Treatment.** Have the casualty avoid putting weight on the injured joint. If you are unsure whether the injury is a strain or sprain, treat it as a sprain.

[Continue with Exercises](#)

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## LESSON EXERCISES: LESSON 6

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. A sprain results when the \_\_\_\_\_ connecting two bones are stretched or torn.
  - a. Ligaments.
  - b. Muscles.
  - c. Nerves.
  - d. Tendons.
  
2. A soldier has been injured. He has pain in his upper thigh region. The affected leg looks deformed, but does not appear to be broken. The soldier says he cannot move the leg. The soldier probably has a:
  - a. Dislocation.
  - b. Spinal fracture.
  - c. Sprain.
  - d. Strain.
  
3. Which of the following is a proper procedure for treating a dislocation.
  - a. Realign the limb by forcing the bone back into position.
  - b. Splint the limb in the position it was found.
  - c. Apply heat to the joint for the first 24 hours; apply cold thereafter.
  - d. a and c are correct.
  - e. b and c are correct.



4. Which of the following is a proper procedure for treating a dislocation?
  - a. Splint the limb in the position it was found.
  - b. Apply cold to the joint for the first 24 hours; apply heat thereafter.
  - c. Elevate the joint.
  - d. a and c are correct.
  - e. a, b and c are correct.
  
5. During training, a soldier falls. He says that he has a pulled muscle in his leg. The leg is not deformed. What should you do?
  - a. Treat the injury as a spinal injury.
  - b. Help the soldier stand up and "walk off" the pain.
  - c. Tell the soldier to avoid putting weight on the injured leg.
  
6. A soldier has fallen from a wall. When you reach him, he is conscious and lying on his chest. There is a bruise on his neck and his head appears to be in an unusual position. What should you do?
  - a. Turn him onto his back and immobilize his head and neck.
  - b. Apply a splint to his neck, immobilizing his head and back.
  - c. Tell him to avoid moving his head.
  - d. a, b, and c above.

7. A soldier has fallen from a wall. When you reach him, he is conscious and lying on his back. He says that his left leg hurts and that he cannot move it. He has movement in his right leg. When you expose his left leg, there is discoloration and swelling about the middle of his thigh. What should you suspect?
  - a. The casualty has a fracture.
  - b. The casualty has a dislocation.
  - c. The casualty has a strain.
  - d. The casualty has combat stress.
  
8. A soldier has fallen from a wall. When you reach him, he is unconscious and lying on his back. You suspect that he may have an injured spine. What should you do?
  - a. Slip folded material under the casualty to support the arch of his back.
  - b. Slip folded material under the casualty's neck.
  - c. Remove the casualty's boots, fill them with small rocks, secure the rocks with material, tie the tops of the boots, and place the boots around his head to help immobilize the head and neck.
  - d. b and c above.
  - e. a, b, and c above.
  
9. What is the difference between an open fracture and a closed fracture?
  - a. In an open fracture, the skin has been broken. In a closed fracture, the skin is not broken.
  - b. In an open fracture, the bone is completely broken. In a closed fracture, the bone is damaged but not completely broken (for example, a stress fracture).
  - c. In an open fracture, the bone has penetrated the skin and remains visible. In a closed fracture, the broken bone has penetrated the skin and slipped back below the muscles so that it is no longer visible.
  - d. An open fracture is caused by a foreign object such as a bullet while a closed fracture is caused by disease or abnormal muscle contraction.

10. You suspect that the casualty has a closed fracture of the arm. What may indicate the site of the fracture?
  - a. Bruising.
  - b. Swelling.
  - c. Deformity.
  - d. a, b, and c above
  
11. You are in a combat area and see a soldier running for exercise. The soldier trips and falls. When you check on the soldier, he is lying still and says that he thinks he has broken a bone in his left arm. The soldier is wearing a wedding ring. What should you do?
  - a. Leave the ring in place since his finger is not broken.
  - b. Remove the ring and place it in your pocket.
  - c. Remove the ring and place it in the casualty's pocket.
  - d. Either b or c above.
  
12. You suspected that a conscious soldier has a fractured arm. When should you check the casualty's radial (wrist) pulse?
  - a. Before you splint the fracture.
  - b. After you splint the fracture.
  - c. Before and after you splint the fracture.
  - d. None of the above. A pulse is only checked if the soldier is not breathing.
  
13. You suspect that a soldier has a fracture in his lower extremity. When applying the splint, you should immobilize:
  - a. The joint below the fracture site.
  - b. The joint above the fracture site.
  - c. Both the joint above the fracture site and the joint below the fracture site.

14. You are splinting a fracture of the lower extremity. You should secure the splints
- Above the fracture site.
  - On the fracture site.
  - Below the fracture site.
  - a and c above.
  - a, b, and c above.

15. When applying a splint, what can you do to help maintain blood circulation?
- 

16. Which of the following indicate poor blood circulation?

- Pulse is rapid.
- Skin is cool to the touch.
- Skin appears reddish.
- Blanch test results in a rapid return of color to the tested nail bed.
- All of the above.

17. When applying a splint, areas such as the knee and armpit require:

- No padding.
- Less padding than the rest of the splinted body part.
- More padding than the rest of the splinted body part.

18. You are applying a swathe to a soldier with a fractured upper arm. Should the swathe cover the fracture site?

- Yes.
- No.

19. You have applied a splint to a fractured arm. Before applying the splint, the wrist had a strong pulse. Now the pulse is weak. What should you do?
- Loosen the top cravat (nearest the heart) and retie it. Continue loosening and retying cravats until the circulation is restored.
  - Loosen the lowest cravat (farthest from the heart) and retie it. Continue loosening and retying cravats until the circulation is restored.
  - Apply a tourniquet above the fracture site.
  - Apply a tourniquet to the fracture site.
20. You have splinted a casualty's fractured forearm and are going to apply a swathe and sling. Which should you apply first?
- Sling.
  - Swathe.
21. You are making a sling out of a triangular bandage. The casualty has a fractured left forearm. Where should you position the knot made from tying the two ends of the bandage together?
- The fracture site.
  - The hollow on the right (uninjured side) of the casualty's neck.
  - The hollow on the left (injured side) of the casualty's neck.
  - The back of the casualty's neck between the two hollows.
22. You are applying a swathe to a casualty with a fractured left forearm. Which of the following is correct?
- Apply the swathe over the right upper arm and under the left upper arm.
  - Apply the swathe over the left upper arm and under the right upper arm.
  - Apply the swathe over both upper arms.

**Check Your Answers on Next Page**

## **SOLUTIONS TO LESSON EXERCISES: LESSON 6**

1. a (paras 6-11, 6-1c)
2. a (para 6-10a, fig 6-17)
3. b (paras 6-10b(2), (3))
4. e (paras 6-11b(1), (2))
5. c (para 6-12b)
6. c (paras 6-5c(1), (2))
7. a (para 6-3, 6-4c, d, e, g)
8. e (paras 6-5c(2)(a), (b), (c))
9. a (paras 6-2 a, b)
10. d (para 6-6c)
11. c (para 6-6d)
12. c (paras 6-6e, 6-7e)
13. c (paras 6-7a(2), d(1))
14. d (paras 6-7a(2), (2) Caution)
15. Put padding between the rigid objects and the casualty's body  
(paras 6-6g(2), 6-7c)
16. b (paras 6-7e, 6-6e(2))
17. c (para 6-7c)
18. b (para 6-9b Caution)
19. a (para 6-7e)
20. a (para 6-9b, fig 6-15)
21. b (para 6-8f)
22. b (para 6-9d(2))

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## LESSON ASSIGNMENT

### LESSON 7

Evacuating a Casualty.

### LESSON ASSIGNMENT

Paragraphs 7-1 through 7-12.

### LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 7-1 Identify the steps for performing the fireman's carry.
- 7-2. Identify the steps for performing the neck drag.
- 7-3. Identify the steps for performing the cradle drop drag.
- 7-4. Identify the procedures for evacuating a casualty using a SKED litter.
- 7-5. Identify the procedures for making an improvised blanket and pole litter.
- 7-6. Identify the procedures for making an improvised poncho and pole litter.
- 7-7. Identify the procedures for making an improvised jacket and pole litter.
- 7-8. Identify the procedures for making an improvised sack and pole litter.
- 7-9. Identify the procedures for making an improvised blanket litter.

### REFERENCES

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
FM 8-10-6, Medical Evacuation in a Theater of  
Operations.  
Training Support Package 071-D-2320 / First Aid 5  
(Transport a Casualty)

### SUGGESTION

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 7

### EVACUATING A CASUALTY

#### Section I. MANUAL CARRIES

##### 7-1. EVACUATION

Being able to evacuate casualties in a quick and efficient manner will result in saving lives. There are times when a standard medical litter is available for evacuation. However, in many situations, you will need to use a SKED<sup>®</sup> litter. If a SKED litter is not available, you may need to construct an improvised litter from available materials. Sometimes, you will need to use a manual carry to transport a casualty to a place of safety where he can be placed onto a litter. Three common one-man manual carries for moving a casualty are the fireman's carry, the neck drag, and the cradle drop drag.

##### 7-2. FIREMAN'S CARRY

The fireman's carry is usually used to quickly move an unconscious or disabled casualty for a moderate or long distance. This carry leaves one of the bearer's arms free to carry a rifle, move around obstacles, and so forth.

a. **Position the Casualty in a Prone Position.** If the casualty is lying on his back, turn the casualty onto his stomach.

- (1) Kneel at the casualty's uninjured side.

**CAUTION:** If you are in a chemical environment, squat--do not kneel on the ground.

- (2) Place the casualty's arms above his head.
- (3) Cross his far ankle over the near one.
- (4) Grasp the casualty's clothing at his far shoulder and hip.
- (5) Gently pull so that the casualty rolls toward you (figure 7-1). Continue until the casualty is on his abdomen.
- (6) Straighten his legs.

b. **Raise the Casualty to a Standing Position.**

- (1) Straddle the casualty, slip your hands under his chest, and lock your hands together (figure 7-2 A).

(2) Lift the casualty and begin walking backwards until he is on his knees (figure 7-2 B).

(3) Continue walking backwards until his legs are straight and his knees are locked (figure 7-2 C).

(4) Walk forward and bring the casualty to a standing position (figure 7-2 D). Keep the casualty tilted slightly backwards so his knees will remain locked. If his knees do not remain locked, walk backward until they lock and then move forward until the casualty is in the standing position.

**c. Move to a Face-to-Face Position.**

(1) Grasp one of the casualty's wrists and raise his arm. Use your other arm to hold the casualty erect (figure 7-2 E).

(2) Move under the casualty's arm to his front so that you are facing the casualty, replace his arm, and hold the casualty around his waist (figure 7-2 F).

(3) Place your foot between the casualty's feet and spread them so that his feet are about six to eight inches apart.

**d. Raise the Casualty Onto Your Shoulder.**

(1) Grasp the casualty's wrist and lift his arm over his head while continuing to support the casualty with your other arm (figure 7-3 A).

**CAUTION:** If the casualty has an injured arm, grasp the wrist of the uninjured arm.

(2) Bend at the waist and kneel, pulling the casualty over your shoulder. At the same time, slip your arm from his waist, pass the arm between the casualty's legs, and grasp behind the casualty's knee (figure 7-3 B).

(3) Move the hand grasping the casualty's wrist to the hand at the casualty's knee. (This moves the casualty's wrist to the casualty's knee.)

(4) Grasp the casualty's wrist with the hand at the casualty's knee, freeing your other hand (figure 7-3 C).

(5) Place your free hand on your knee and slowly rise to a standing position (figure 7-3 D). Use the hand on your knee to help you rise without straining your back.

**e. Transport the Casualty.** Adjust the casualty's body so his weight is distributed comfortably. Then move forward, carrying the casualty.



Figure 7-1. Turning a casualty to a prone position.

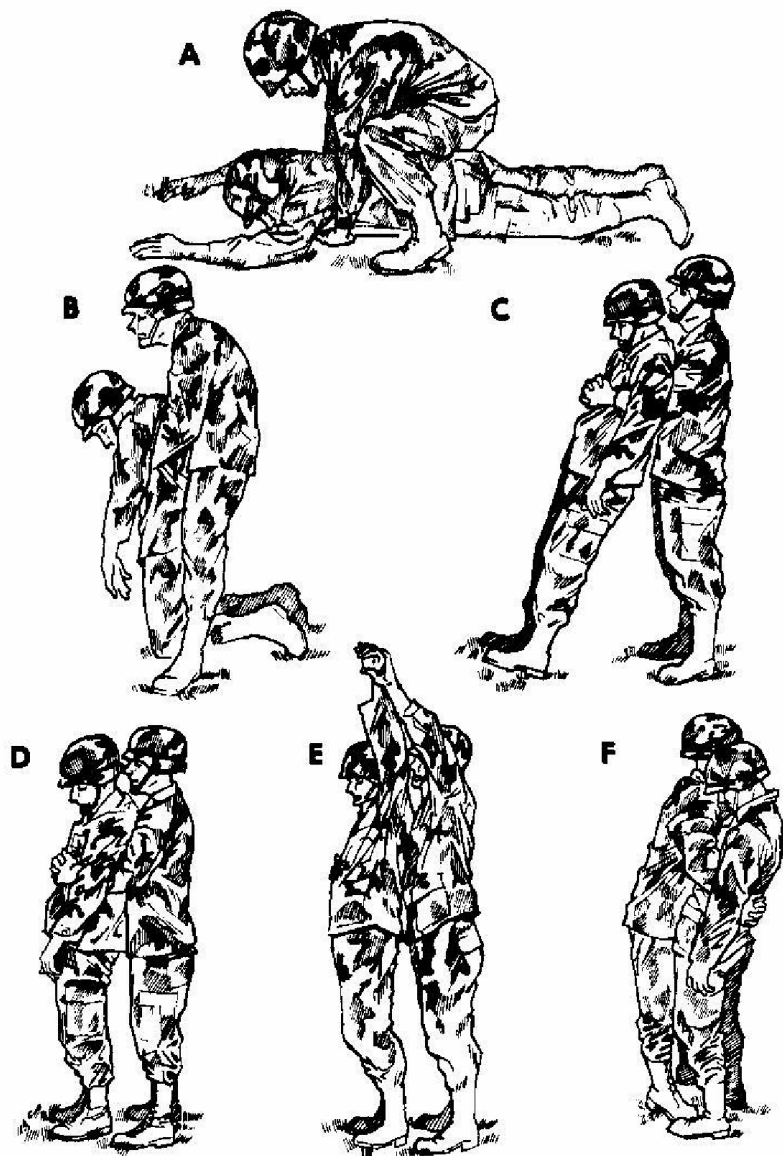


Figure 7-2. Raising a casualty to a standing position.

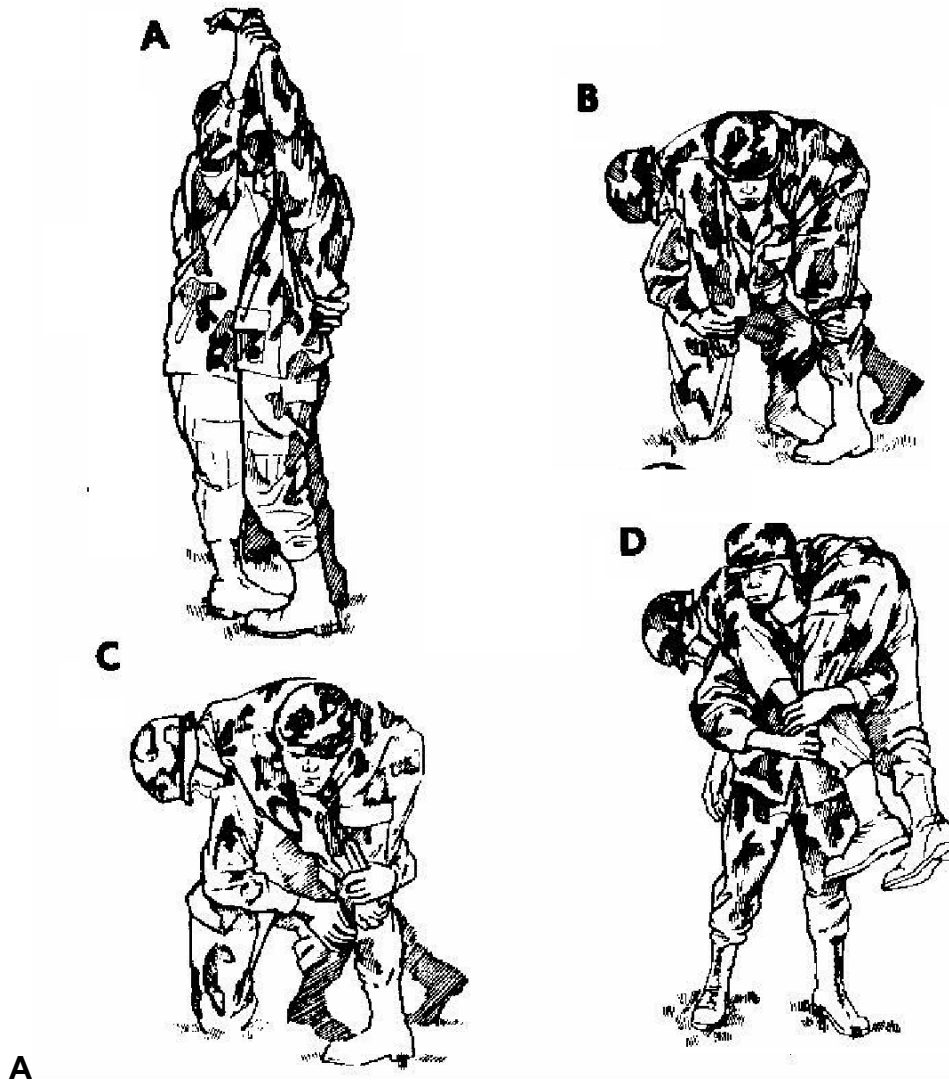


Figure 7-3. Fireman's carry

### 7-3. NECK DRAG

The neck drag (figure 7-4) is generally used to move a conscious or unconscious casualty for a short distance. This carry allows the rescuer to stay close to the ground. The carry can be used when moving behind a low wall, under a vehicle, or through a culvert. The neck drag is not used if the casualty has a broken arm or wrist.

- a. Tie the casualty's hands together with material that will not cut his wrists, such as the casualty's field dressing or a cravat. Do not tie the materials tight enough to interfere with blood circulation. If the casualty is conscious, have him interlock his fingers.
- b. Face the casualty's head and straddle his hips on your knees.

- c. Loop the casualty's arms around your neck.
- d. Crawl forward on your hands and knees, dragging the casualty beneath you.



Figure 7-4. Neck drag.

**CAUTION:** If the casualty is unconscious, keep his head from dragging on the ground.

#### 7-4. CRADLE DROP DRAG

The cradle drop drag is generally used to move a conscious or unconscious casualty up or down steps or to quickly move a casualty from a life-threatening situation (fire, and so forth).

- a. Position the casualty on his back.
- b. Kneel at the casualty's head.
- c. Slide your hands (palms up) under his shoulders and grasp the clothing under his armpits (figure 7-5 A).
- d. Partially rise so that the casualty is pulled to a semi-sitting position. Support his head on one of your forearms. If possible, bring your elbows together and use both forearms to support the head (figure 7-5 B).
- e. Rise to a stooped position and drag the soldier backward (figure 7-5 C).

**CAUTION:** If you are going down steps, walk down them carefully going backward. Support the soldier's head and shoulders, letting his hips and legs drop from step to step (figure 7-5 D).

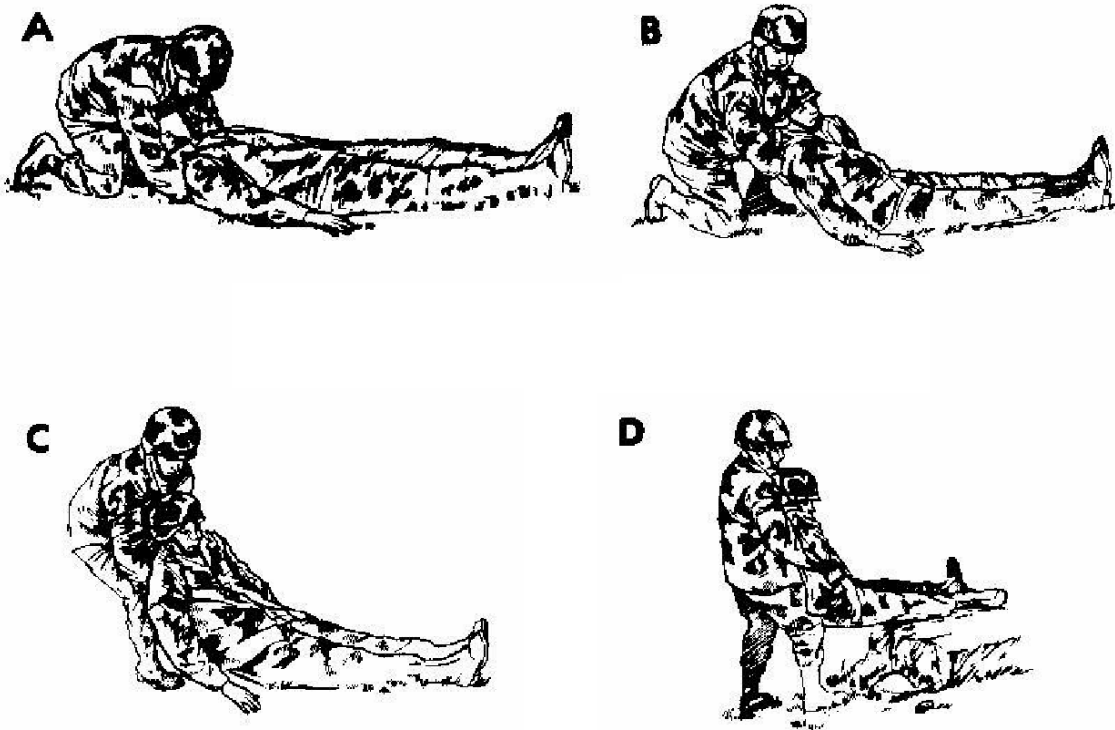


Figure 7-5. Cradle drop drag.

## Section II. SKED AND IMPROVISED LITTERS

### 7-5. SKED LITTER

The SKED<sup>®</sup> litter (made by SKEDCO, Incorporated) is a compact and lightweight transport system used to evacuate a casualty over land. It can also be used to rescue a casualty in water. A SKED litter is illustrated in figure 7-6. Note the four handholds. Also note the dragline at the head of the litter.

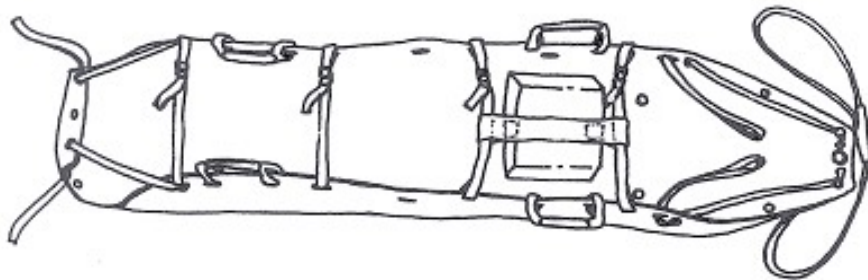


Figure 7-6. SKED litter.

#### a. Prepare the SKED.

- (1) Remove the SKED litter from its pack and place it on the ground.
- (2) Unfasten the retainer strap.

(3) Step on the foot end of the SKED litter and unroll the SKED completely.

(4) Bend the SKED litter in half and back roll. Repeat with the opposite end of the litter. The SKED litter should now lay flat.

**b. Place the Casualty on the SKED.**

(1) Place the SKED litter next to the casualty. Make sure the head end of the litter is next to the casualty's head.

(2) Place the cross straps under the SKED litter.

(3) Log roll the casualty onto his side in a steady and even manner. If additional personnel are available, use them to help you roll the casualty and to support his head and neck.

(4) Slide the SKED litter as far under the casualty as possible (Litter is to the casualty's back.)

(5) Gently roll the casualty until he is again lying on his back with the litter beneath him.

(6) Slide the casualty to the middle of the SKED litter, keeping his spinal column as straight as possible.

**c. Secure the Casualty to the SKED.**

(1) Pull out the straps from under the SKED litter.

(2) Bring the straps across the casualty.

(3) Lift the sides of the SKED litter and fasten the four cross straps to the buckles directly opposite the straps.

(4) Lift the foot portion of the SKED litter.

(5) Feed the foot straps over the casualty's lower extremities and through the unused grommets at the foot end of the SKED litter.

(6) Fasten the straps to the buckles.

(7) Check to make sure the casualty is secured to the SKED litter.



#### **d. Transport the Casualty.**

(1) Ideally, you and three other soldiers will be available to evacuate the casualty. A four-man litter carry can be used to quickly and safely transport a casualty on a SKED litter to a nearby collection point where he can be transferred to a ground or air ambulance.

(a) Each bearer kneels at one of the handles. They should kneel on the knee closest to the litter and face in the same direction, usually so that the casualty's feet are in the direction of travel. The leader of the litter team should position himself at the handle nearest the casualty's right shoulder and direct the other bearers. This position allows the leader to monitor the casualty during the evacuation.

(b) Upon command from the leader, the bearers stand up in unison, lifting the casualty.

(c) Upon command from the leader, the bearers carry the casualty, adjusting as needed to keep the casualty as level as possible.

(2) If only one other soldier is available, position yourself on opposite sides of the litter and face toward the casualty, kneel on one knee, and grab the two near handholds. Upon the command from the leader, both rise in unison, lifting the casualty.

(3) If no other person is available, use the dragline at the head of the litter to drag the casualty.

### **7-6 IMPROVISED LITTERS**

There are times when a casualty may have to be moved and a standard litter or SKED litter is not available. The distance may be too great for manual carries or the casualty may have an injury that would be aggravated by manual transportation. In these situations, litters can be improvised from materials at hand. Improvised litters must be as well constructed as possible to avoid the risk of dropping or further injuring the casualty. Improvised litters are emergency measures and should be replaced by standard litters at the first opportunity. Many different types of litters can be improvised, depending upon materials available. Some are described in the following paragraphs.

#### **7-7. BLANKET AND POLE LITTER**

An improvised litter can be made using two tent poles and a blanket. When the casualty is placed on the litter, his weight will hold the litter together.

a. Open the blanket and lay it flat on the ground.

b. Place a pole in the middle of the blanket dividing its length into two equal sections.

c. Lift one edge of the blanket and bring the blanket section over the pole so that it lies on top of the other half of the blanket (figure 7-7 A).

d. Place a second pole so that it divides the doubled blanket into two equal sections (figure 7-7 B).

e. Bring the far edge of the blanket over the second pole and place the edge next to the first pole (figure 7-7 C). Note that the "bed" of the litter contains four layers of material. The improvised litter is now ready to receive the casualty.

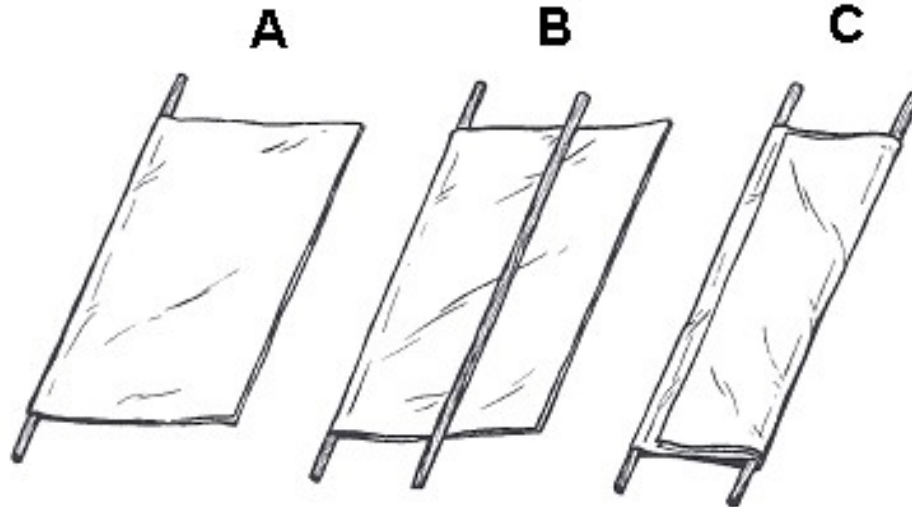


Figure 7-7. Blanket and pole improvised litter.

## 7-8. PONCHO AND POLE LITTER

There are many variations of the blanket and pole improvised litter. Straight tree limbs or other similar rigid objects can be substituted for the poles. A poncho, tent half, waterproof canvas or other material can be used instead of a blanket. Instructions for improvising a litter using two tent poles and a poncho are given below.

a. Open the poncho and lay it flat on the ground.

b. Lay two poles across the poncho so that the poncho is divided into thirds (figure 7-8 A).

c. Reach in and pull the hood toward you and lay it flat on the poncho. Make sure the drawstrings are not hanging out of the hole. (The hood and drawstrings could catch on brush or other obstacles if left hanging.)

d. Fold one outer third of the poncho over the pole and bring the outer edge of the poncho mater next to the far pole (figure 7-8 B).

e. Fold the other outer third of the poncho over its pole in the same manner (figure 7-8 C).

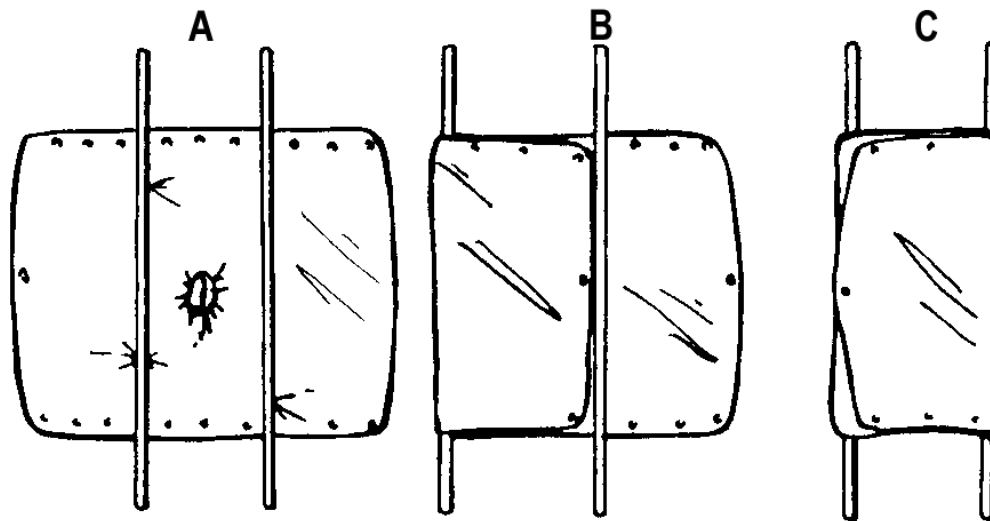


Figure 7-8. Poncho and pole improvised litter.

**NOTE:** The "bed" of the litter contains three layers of material.

### 7-9. JACKET AND POLE LITTER

An improvised litter can be made using two tent poles and two or three field jackets. Tree limbs or other straight, rigid objects can be used instead of the poles. Heavy shirts, BDU/ACU shirts, or other jackets can be used instead of field jackets.

- a. Close (zip or button) the jackets (or other garments).
- b. Turn the garments inside out, but leave the sleeves inside (figure 7-9 A). Turning the garments inside out puts buttons and zippers on the inside. This keeps the casualty from lying on buttons or zippers (if on top) and keeps them from getting snagged on bushes or other obstacles (if on bottom).
- c. Place one garment below the other so that the sleeves are aligned.
- d. Slide the poles through the sleeves (figure 7-9 B).

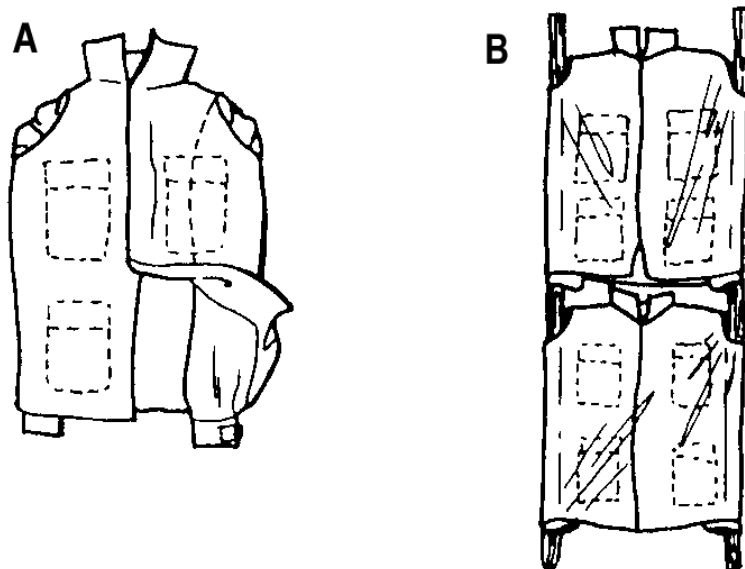


Figure 7-9. Jacket and pole improvised litter.

### 7-10. SACK AND POLE LITTER

An improvised litter can be made using two tent poles or similar rigid objects and two empty heavy fabric sacks, such as potato sacks. A pole and sack improvised litter is shown in figure 7-10.

- a. Cut holes in the two corners of the closed end of each sack.
- b. Place the sacks lengthwise so the open ends of the sacks are facing each other.
- c. Slide the poles or limbs through the holes.
- d. Overlap the open ends of the sacks about three inches to provide extra strength in the middle of the litter.

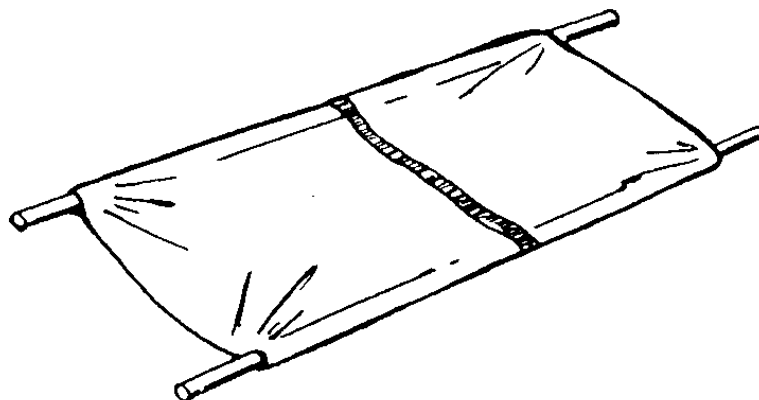


Figure 7-10. Sack and pole improvised litter.

## 7-11. BLANKET LITTER

An improvised litter can be made using only a blanket or other material. The blanket is laid on the ground and two opposite edges of the blanket are rolled toward the middle (figure 7-11). When the casualty is placed on the blanket, the rolled edges of the blanket are used as grips (figure 7-12). Four or more litter bearers should be used when transporting a casualty using the blanket litter.

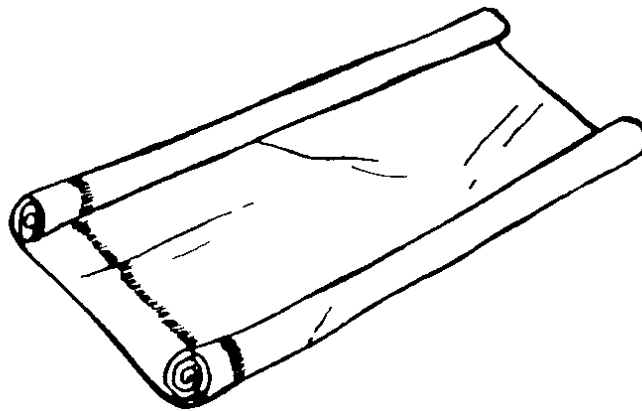


Figure 7-11. Blanket improvised litter.



Figure 7-12. Evacuating a casualty using an improvised blanket litter.

## 7-12. TRANSPORTING A CASUALTY ON A LITTER

### a. General Rules

(1) Explain the procedure to the casualty. If the casualty is conscious, tell him what you are going to do. The explanation will help to calm his fears and will help you to get his cooperation.

(2) Walk around the casualty. Walk around the casualty rather than stepping over him. If you step over the casualty, he may flinch or tighten his muscles and aggravate his injuries. In addition, mud or other debris from your boots may fall into his eyes or wound.

(3) Perform necessary measures before transporting. Make sure the casualty is breathing properly, that open wounds have been dressed and bandaged, and that fractures have been splinted before transporting the casualty.

(4) Have one person in charge of the litter team. One person must give the instructions to the remainder of the team so actions will be performed in unison.

b. **Preparing to Lift the Litter.** If there are four litter bearers, each bearer positions himself at one of the handles, faces so that the casualty will be carried feet first, kneels on the knee nearest the litter, and grabs the litter handle (figure 7-13 A). The leader of the litter team should position himself at the handle nearest the casualty's right shoulder and direct the other bearers. This position allows the leader to monitor the casualty during the evacuation.

**NOTE:** The combat medic may instruct the litter team to carry the casualty head first based upon the casualty's injuries.

c. **Lifting the Litter.** Upon command of the leader, the four litter bearers lift the litter in unison (figure 7-13 B) and transport the casualty to the aid station, collection point, or other destination.

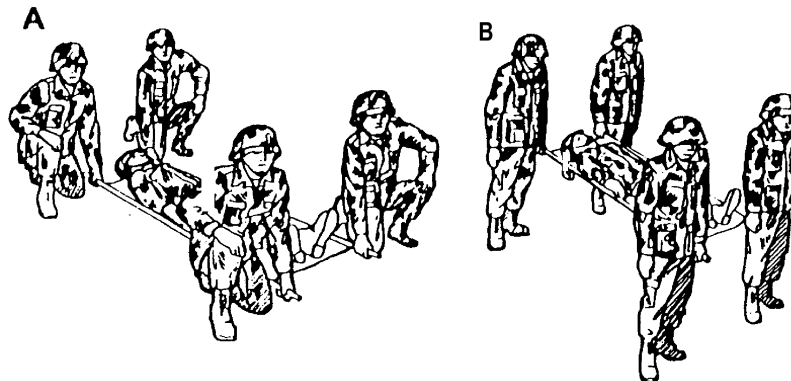


Figure 7-13. Lifting a casualty using a four-man litter team.

## LESSON EXERCISES: LESSON 7

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

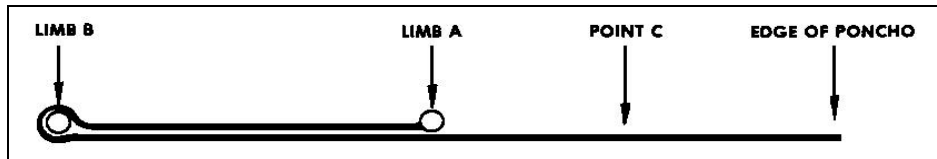
1. When preparing the casualty to be transported using the fireman's carry, you should position the casualty in a \_\_\_\_\_ position.
  - a. Prone (on his stomach).
  - b. Supine (on his back).
  
2. A casualty is lying on his back. He has a dressed wound on his left side. In order to turn him onto his abdomen, you should:
  - a. Kneel at his left side, grab his far shoulder and hip, and pull so the casualty rolls onto his front.
  - b. Kneel at his left side, grab his near shoulder and hip, and push so the casualty rolls onto his front.
  - c. Kneel at his right side, grab his near shoulder and hip, and push so the casualty rolls onto his front.
  - d. Kneel at his right side, grab his far shoulder and hip, and pull so the casualty rolls onto his front.
  
3. Which manual carry is commonly used to move a casualty up or down stairs?
  - a. Fireman's carry.
  - b. Neck drag.
  - c. Cradle drop drag.

4. In which manual carry do you tie the casualty's wrists together?
  - a. Fireman's carry.
  - b. Neck drag.
  - c. Cradle drop drag.
  
5. The dragline is located at the \_\_\_\_\_ of the SKED litter.
  - a. Head.
  - b. Foot.
  
6. In the SKED, the casualty's feet are secured by:
  - a. The same straps used to secure his torso.
  - b. A separate set of straps.
  
7. A soldier says, "All improvised litters require two rigid objects, such as tent poles or tree limbs." Is he correct?
  - a. Yes.
  - b. No.
  
8. When preparing field jackets for a pole and jacket improvised litter, you should close the jackets and:
  - a. Turn them inside out with the sleeves on the outside of the body of the jackets.
  - b. Tie the ends of the sleeves with a double knot.
  - c. Turn them inside out with one sleeve on the outside and one sleeve on the inside of the body of the jackets.
  - d. Turn them inside out with the sleeves inside the body of the jackets.



9. You are constructing a pole and sack improvised litter. You have cut the corners of the closed ends of the sacks. How should the sacks be positioned on the pole?
  - a. Both open ends should be toward the casualty's head.
  - b. The closed ends of the sacks should be together.
  - c. The open ends of the sacks should be together.
  - d. Both closed ends should be toward the casualty's head.

10. You are making an improvised litter using a poncho and two straight tree limbs. You are at the stage shown below (side view). What should you do next?



- a. Fold the poncho at Point C so that the edge of poncho will rest next to Limb A.
  - b. Fold the edge of poncho over Limb A so that the edge of poncho is next to Limb B.
  - c. Bring Limb B over Limb A so that Limb B will rest at the edge of poncho.
11. You and three other litter bearers are going to evacuate a casualty. You are going to direct the other bearers. Where should you position yourself?
    - a. Near the casualty's right shoulder.
    - b. Near the casualty's left shoulder.
    - c. Near the casualty's right foot.
    - d. Near the casualty's left foot.

12. You and three other soldiers are preparing to lift a casualty lying on a litter. The litter bearers are positioned facing the same direction with:
  - a. Both knees on the ground.
  - b. The knee nearest the litter on the ground.
  - c. The knee farther from the litter on the ground.
  
13. When a litter team rises:
  - a. The two litter bearers at the casualty's head rise first.
  - b. The two litter bearers at the casualty's feet rise first.
  - c. All four litter bearers rise at the same time.
  
14. Normally, a casualty on a litter is carried with his \_\_\_\_\_ toward the direction of travel.
  - a. Head.
  - b. Feet.
  
15. Get with another person and practice performing the fireman's carry.
  
16. If possible, obtain a SKED litter. Have four people (one to play the role of the casualty, the other to play the roles of the litter bearers) help you practice preparing and using a SKED litter to transport a casualty.
  
17. Practice making improvised litters from available materials (two tent poles or similar rigid objects, a blanket, a poncho, two field jackets.)

## **SOLUTIONS TO LESSON EXERCISES: LESSON 7**

1. a (para 7-2a)
2. d (paras 7-2a(1), (2), (3))
3. c (para 7-4)
4. b (para 7-3a)
5. a (para 7-5)
6. b (para 7-5c)
7. b (para 7-11)
8. d (para 7-9b)
9. c (para 7-10b)
10. b (para 7-8a, fig 7-8)
11. a (para 7-12b, 7-5d(1)(a))
12. b (para 7-12b)
13. c (para 7-12c)
14. b (para 7-12b, fig 7-13)
15. See the following checklist
16. See the second checklist
17. See the final three checklists.

## TRANSPORT A CASUALTY USING A FIREMAN'S CARRY

**Given:** Simulated unconscious casualty lying on his back

	GO	NO-GO
1. Kneels at casualty's side.	_____	_____
2. Places casualty's arms above his head.	_____	_____
3. Grasps casualty's far shoulder and far hip/thigh and rolls casualty onto his stomach as a unit.	_____	_____
4. Straddles the casualty, facing casualty's head.	_____	_____
5. Puts his hands under the casualty's chest and locks his hands.	_____	_____
6. Raises casualty to knees by walking backward.	_____	_____
7. Continues to move backward until casualty's knees lock.	_____	_____
8. Walks forward until casualty is in standing position.	_____	_____
9. Lifts casualty's arm and moves under the arm to stand facing the casualty while still supporting casualty.	_____	_____
10. Places arms around casualty's waist, places one foot between casualty's feet, and spreads the feet.	_____	_____
11. Grasps casualty's wrist, raises casualty's arm, stoops, and pulls casualty across shoulders.	_____	_____
12. Places his free arm between casualty's legs, brings hand around leg, and grasps the casualty's wrist.	_____	_____
13. Rises to standing position with casualty supported across shoulders and one hand free to carry weapon.	_____	_____
14. Walks forward without falling or dropping casualty.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	<b>GO</b>	<b>NO-GO</b>

## EVACUATE A CASUALTY USING A SKED LITTER

**Given:** Simulated unconscious casualty lying on his back.  
 SKED® litter (rolled up).  
 Three soldiers acting as assistants when so instructed.

	GO	NO-GO
1. Removes the SKED litter from its pack, places it on the ground, and unfastens the retainer strap.	_____	_____
2. Steps on the foot end of the SKED litter and unrolls the SKED completely.	_____	_____
3. Bends the SKED litter in half and back roll, then repeats with the opposite end of the litter so the litter lays flat.	_____	_____
4. Places the SKED litter next to the casualty with the head end of the litter next to the casualty's head.	_____	_____
5. Places the cross straps under the SKED litter.	_____	_____
6. Log rolls the casualty onto his side, keeping the head and neck supported. (May have assistants help.)	_____	_____
7. Slides (or has assistant slide) the SKED litter as far under the casualty as possible.	_____	_____
8. Gently rolls the casualty until he is lying on his back with the litter beneath him. (May have assistants help.)	_____	_____
9. Slides he casualty to the middle of the SKED litter. (May have assistants help.)	_____	_____
10. Pulls out the straps from under the SKED litter and brings the straps across the casualty. (May have assistants help.)	_____	_____
11. Lifts the sides of the SKED litter and fastens the four cross straps to the buckles directly opposite the straps. (May have assistants help.)	_____	_____
12. Lifts the foot portion of the SKED litter, feeds the foot straps over the casualty's lower extremities and through the unused grommets at the foot end of the SKED litter, and fasten the straps to the buckles. (May have assistants help.)	_____	_____
13. The casualty is safely secured to the SKED litter.	_____	_____
14. Kneels at a handle of the SKED litter and has assistants kneel at the other three handles.	_____	_____
15. Orders assistants to lift the casualty so that the casualty is lifted in unison and the bearers are facing in the same direction.	_____	_____
OVERALL EVALUATION	GO	NO-GO
(A no-go on any step will result in a no-go for the entire task)		

### MAKE A BLANKET AND POLE IMPROVISED LITTER

**Given:** Blanket  
Two tent poles

	GO	NO-GO
1. Opens the blanket and lays it flat on the ground.	_____	_____
2. Places a pole in the middle of the blanket dividing the blanket into two sections.	_____	_____
3. Lifts one edge of the blanket and brings it over the pole so that the section lies on top of the other half of the blanket.	_____	_____
4. Places a second pole so that it divides the doubled blanked into two parts.	_____	_____
5. Brings the far edge of the blanked over the second pole and places the edge next to the first pole.	_____	_____

OVERALL EVALUATION  
(A no-go on any step will result in a no-go for the entire task)

GO NO-GO

### MAKE A PONCHO AND POLE IMPROVISED LITTER

**Given:** Poncho  
Two tent poles

	GO	NO-GO
1. Opens the poncho and lays it flat on the ground.	_____	_____
2. Lays two poles across the poncho so that the poncho is divided into thirds.	_____	_____
3. Pulls the hood out and lays it flat on the poncho. Drawstrings do not hang out of the hole.	_____	_____
4. Folds one outer third of the poncho over the pole.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO

### MAKE A JACKET AND POLE IMPROVISED LITTER

**Given:** Two field jackets  
Two tent poles

	GO	NO-GO
1. Zips the jackets closed.	_____	_____
2. Turns the garments inside out, leaving the sleeves inside	_____	_____
3. Places one garment below the other so that the sleeves are aligned.	_____	_____
4. Slides the poles through the sleeves.	_____	_____
<b>OVERALL EVALUATION</b> (A no-go on any step will result in a no-go for the entire task)	GO	NO-GO





## **LESSON ASSIGNMENT**

### **LESSON 8**

Treating a Nerve Agent Casualty.

### **LESSON ASSIGNMENT**

Paragraphs 8-1 through 8-12.

### **LESSON OBJECTIVES**

After completing this lesson, you should be able to:

- 8-1. Identify signs and symptoms of mild and severe nerve agent poisoning.
- 8-2. Identify the proper sequence of actions for protecting yourself in a chemical environment.
- 8-3. Identify the proper sequence of actions for administering buddy-aid to a nerve agent casualty.
- 8-4. Identify the proper procedures for administering ATNAA (self-aid and buddy-aid).
- 8-5. Identify the proper procedures for administering MARK I (self-aid and buddy-aid).
- 8-6. Identify the proper procedures for putting on a protective mask (self-aid and buddy-aid).
- 8-7. Identify the proper procedures for decontaminating exposed skin.
- 8-8. Identify the proper procedures for administering CANA.

### **REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.  
FM 4-25.11, First Aid.  
FM 100-14, Risk Management.  
FM 8-285, Treatment of Chemical Agent Casualties  
and Conventional Military Chemical Injuries  
Training Support Package 071-D-2322 / First Aid 7  
(Administer Nerve Agent Antidote)

### **SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.

## LESSON 8

### TREATING A NERVE AGENT CASUALTY

#### Section I. SELF-AID

##### 8-1. INTRODUCTION

Chemical agents are intended for use in military operations. They are designed to kill or incapacitate personnel due to the chemical effects of the agent. Chemical agents may be inhaled, ingested when food or water contaminated by the agent is consumed, or absorbed when the agent comes into contact with the skin or eyes. Nerve agents are among the deadliest chemical agents.

a. **World War I.** Chemical agents such as mustard gas and chlorine gas were used in World War I.

b. **World War II.** Germany developed nerve agents before the start of World War II. However, Germany did not use them in warfare, probably because the German military was afraid that the Allies would launch chemical agent attacks against Germany if they did. In the closing days of the war, the United States and its allies discovered these stockpiles, developed the agents, and manufactured nerve agent munitions, especially Sarin (GB) and VX. Today, intelligence analysts indicate that many countries have the technology to manufacture nerve agent munitions.

c. **Nerve Agents.** Nerve agents are the most toxic of known chemical agents. Nerve agents directly affect the human nervous system. If the person is exposed to a sufficient amount of nerve agent (either high concentrations for a short period of time or low concentrations over a longer period of time), the diaphragm and the intercostal muscles of the chest become paralyzed. The paralysis of these muscles results in the casualty not being able to inhale and exhale. Respiratory failure leads to cardiac arrest and death.

(1) Nerve agents are hazards in their liquid and vapor states and can cause death within minutes after exposure. Nerve agents can be dispersed from artillery shells, mortar shells, missiles, rockets, aircraft bombs, howitzer shells, spray tanks, land mines, and other large munitions. In general, nerve agents are colorless, odorless, and tasteless.

(2) Nerve agents are considered military threat agents. The only known battlefield use of nerve agents was during the Iran-Iraq conflict.

(3) In 1994 and 1995, nerve agents were used for terrorism in Japan when a terrorist cult dispersed Sarin nerve agent in a Tokyo subway. These incidents produced thousands of casualties.

## **8-2. SIGNS AND SYMPTOMS OF MILD NERVE AGENT POISONING**

Nerve agents are absorbed rapidly and the effects are felt immediately. Signs and symptoms of nerve agent poisoning are divided into two groups--mild and severe. A person with mild symptoms is capable of administering first aid to himself (self-aid). A person with severe symptoms is not capable of helping himself and must rely on others to administer first aid (buddy-aid). The number and severity of symptoms that are caused by nerve agent poisoning depend upon the amount of nerve agent absorbed by the body. Early signs and symptoms of nerve agent poisoning include:

- a. A sudden headache.
- b. Blurred vision (difficulty seeing).
- c. An unexplained runny nose.
- d. Excessive flow of saliva (drooling).
- e. Tightness in the chest causing a difficulty in breathing.
- f. Stomach cramps.
- g. Nausea.
- h. Muscular twitching around exposed skin.

## **8-3. TAKING SELF-AID MEASURES**

a. If you are given the "gas" alarm, notice signs and symptoms of nerve agent poisoning in yourself, or notice signs of nerve agent poisoning in other soldiers and you are not wearing your protective mask, you should stop breathing, put on your protective mask, and seek overhead cover or use a poncho to provide cover.

b. If you have signs and symptoms of nerve agent poisoning and have already masked, administer nerve agent antidote to yourself, decontaminate exposed and contaminated skin, and put on the rest of your protective gear.

## **8-4. PUTTING ON YOUR PROTECTIVE MASK**

In case of chemical attack, your first action should be to hold your breath and put on your protective mask immediately. If you are having signs or symptoms of nerve agent poisoning and are not masked, put on your protective mask before injecting yourself with nerve agent antidote. Put on your mask as quickly as possible. You should perform the following steps within 9 seconds.

a. **Stop Breathing.** Stop breathing (hold your breath without inhaling) and close your eyes.

b. **Remove Helmet.** Remove your helmet. If you have a M42-series mask, place the helmet in a convenient location that is not contaminated. If you have a M17-series, M24-series, M40-series, M43-series, or M-45 series mask, put your helmet between your thighs or hold your rifle between your thighs and place your helmet on the muzzle.

c. **Take Off Glasses.** Take off your glasses if you are wearing them and store them in a safe location.

d. **Obtain the Mask.** Open your mask carrier with one hand. Grasp the mask assembly with your other hand and remove the mask from the carrier.

e. **Don the Mask.**

(1) Put your chin in the chin pocket of the mask and press the facepiece snugly against your face.

(2) Grasp the tab and pull the head harness over your head. Make sure your ears are between the temple straps and the cheek straps. Make sure the head harness is pulled far enough over so the forehead straps are tight. (The temple and forehead straps should have been properly adjusted before starting the mission.)

(3) Use one hand to tighten the cheek straps one at a time while holding the head pad centered on the back of your head with the other hand. Make sure the straps lay flat against your head.

f. **Clear the Mask.**

(1) Seal the outlet valve by pushing in the center of the outlet valve cover with one hand

(2) Blow hard to force air out around the edges of the mask. You should feel the air escaping around the edges of the mask. This forces contaminated air from the mask.

g. **Check the Mask for Leaks.**

(1) Cover the inlet port of the filter canister (M40-series and M-45-series) or the inlet port of the armor quick disconnect (M42-series) with the palm of your hand and breathe in.

(2) If the facepiece collapses against your face and remains collapsed while you hold your breath, the mask is airtight.

(3) If the facepiece does not collapse or does not remain collapsed while you hold your breath, remove any hair, clothing, or other matter between your face and the mask. Then repeat the check for leaks.

h. **Resume Breathing.** Once the mask has been successfully checked for leaks, resume normal breathing. The mask will protect you from any nerve agent in the air.

## **8-5. PUTTING ON YOUR PROTECTIVE HOOD**

Be careful when putting on the hood because it could snag on the buckles of the head harness and tear.

a. If you have the M17-series, M25-series, or M-43 series protective mask, pull the hood over your head and zip the front closed to cover the exposed skin.

b. If you have the M24-series or M45-series protective mask, replace your helmet on your head and pull the M7 hood over your helmet and head so that it covers your shoulders.

c. If you have the M40-series protective mask, don the hood so that it lies smoothly on your head. For masks with a regular hood:

(1) Grasp the back edge of the hood skirt.

(2) Pull the hood completely over your head so the hood covers the back of your head, neck, and shoulders.

(3) Zip the front of the hood closed by pulling the zipper slider downward.

(4) Tighten the draw cord.

(5) Secure the underarm straps by fastening and adjusting the straps.

d. After you have the hood in place, put on your helmet (if you have not already put it on) and close your mask carrier.

## **8-6. GIVING THE ALARM**

If you suspect the presence of a chemical or biological agent and do not have your protective mask on, stop breathing and put on your mask and hood. Once you are masked, give the alarm to warn other soldiers to put on their mask and hood immediately. The alarm can be given verbally by yelling "Gas!" or by giving the hand and arm signal (figure 8-1). Give the warning if one of the following occurs.

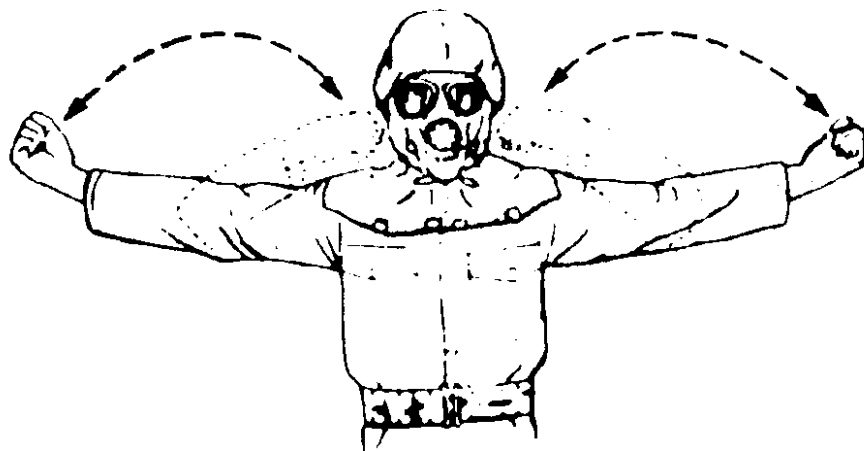


Figure 8-1. Arm and hand signal for chemical attack.

- a. You detect signs and symptoms of nerve agent poisoning in yourself or another soldier.
- b. The alarm on a mechanical chemical agent detector device sounds.
- c. Your M9 detector paper changes color.
- d. Some artillery rounds explode less powerfully than they should.
- e. Bomblets from an aircraft or a rocket pop rather than explode.
- f. An aircraft sprays a mist or gas.

### 8-7. ADMINISTERING NERVE AGENT ANTIDOTE

If you are having signs and symptoms of nerve agent poisoning, administer one nerve agent antidote kit (NAAK) to yourself. There are two types of NAAK--the MARK I (figure 8-2) and the Antidote Treatment-Nerve Agent Autoinjector (ATNAA) (figure 8-3). Both use atropine and 2-PAM chloride (2-PAM Cl). The MARK I has two autoinjectors, one with atropine and the other with 2-PAM chloride. The ATNAA has both chemicals in a single autoinjector. Each soldier carries three NAAKs and one CANA autoinjector.



Figure 8-2. MARK I nerve agent antidote kit.

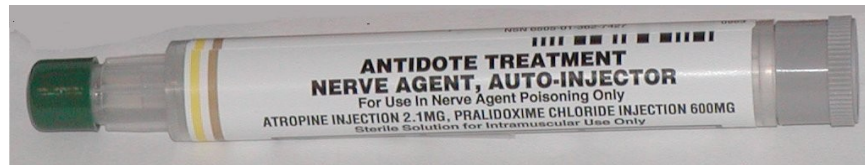


Figure 8-3. Antidote treatment--nerve agent autoinjector (ATNAA).

a. **Obtain Nerve Agent Antidote Kit.** Remove one NAAK from its location. Each soldier is authorized to carry three NAAK sets. The NAAK sets are usually carried in the inside pocket of the mask carrier or MOPP pocket IAW unit SOP. The carrier is normally positioned on the left hip. When the temperature is below freezing, the sets are carried in accordance to local SOP.

b. **Identify Injection Site.** It is important to administer the injection in a large muscle mass without striking bone, major nerves, or major blood vessels.

(1) Thigh. Normally, you will administer the autoinjector(s) in the thigh on your dominant side (figure 8-4 A). Injections may be given in any part of the lateral thigh muscle from about a hand's width above the knee to a hand's width below the hip joint.

(2) Buttock. If you are very thin, the injection is given in the upper outer quadrant of the buttock on your dominant side (figure 8-4 B). The upper, outer quadrant contains the large muscle, but not the major nerve that crosses the mid-buttocks. Hitting the nerve will cause severe pain and may cause paralysis.

c. **Prepare the Injection Site.** Make sure that all objects that could be struck by the needle are removed from the pocket over the injection site.

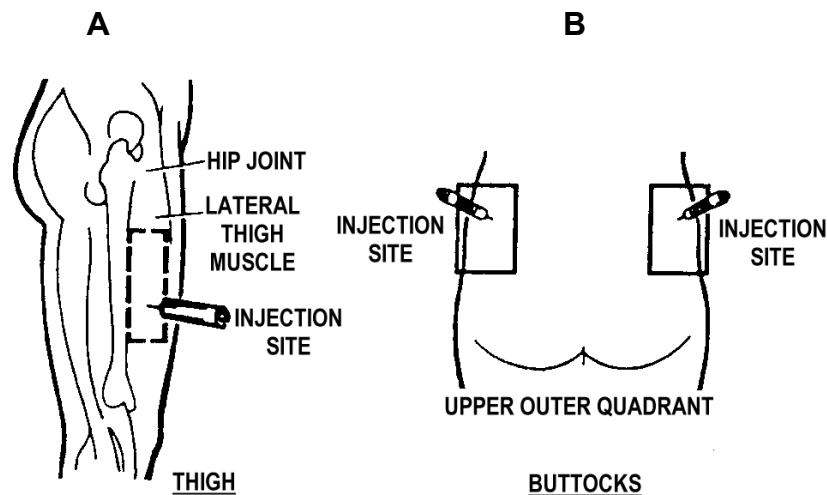


Figure 8-4. Injection sites.

d. **Administer the MARK I, If Used.** Follow these instructions if you are issued the MARK I instead of ATNAA.

(1) Grasp injector set with your nondominant hand by the plastic clip with the big autoinjector (2-PAM CI) on top in front of your body at eye level where you can see it (figure 8-5 A). This will make it easier to remove the injectors from the clip without accident.

(2) Grasp the atropine (small) autoinjector with the thumb and two fingers of the other hand without covering or holding the needle (green) end of the autoinjector (figure 8-5 B). Putting pressure on the green end could cause the autoinjector to function prematurely during removal.

(3) Pull the injector out of the clip with a smooth motion (figure 8-5 C).

**CAUTION:** The injector is now armed. Take care to not press the green (needle) end until the autoinjector is pressed against your thigh.

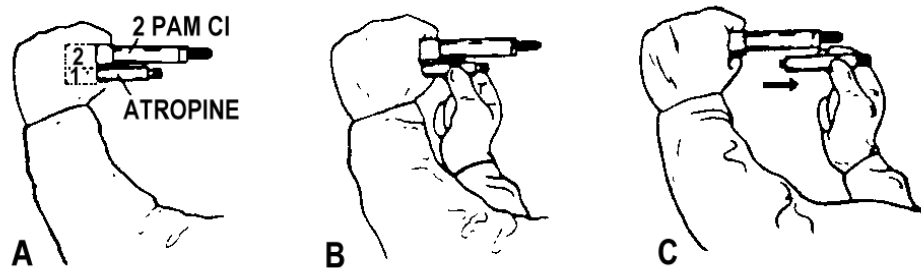


Figure 8-5. Removing the atropine autoinjector from the MARK I clip.

(4) Form a fist around the atropine autoinjector with the needle end (green) extending beyond the little finger end of the fist. Be careful not to inject yourself in the hand. This will not give you a fully effective dose of the antidote. If you should accidentally inject yourself in the hand, you need to obtain another atropine autoinjector and use it to inject yourself in the thigh/buttock.

(5) Make sure the injection site is cleared of any objects that could interfere with the injection. If the injection site is in the thigh, grasp the trouser cargo pocket with your nondominant hand and pull forward, clearing possible obstructions from the site. If you are going to give the injection in your buttock, lift the flap of your jacket if it is covering the injection site. Avoid the mask carrier, straps, buttons, or other possible problems.

(6) Place the green (needle) end of the atropine autoinjector against the selected injection site at a 90° angle.



(7) Apply firm, even pressure to the autoinjector until it functions. Push the autoinjector hard into the muscle to ensure that the needle penetrates both the clothing and skin. Firm pressure automatically triggers the coiled spring mechanism in the autoinjector. This plunges the needle into the muscle and, at the same time, forces fluid through the needle into the muscle tissue. Do not use a jabbing motion.

(8) Hold the autoinjector firmly against the muscle for at least 10 seconds. (The interval of 10 seconds may be estimated by counting one thousand and one, one thousand and two, etc., through one thousand and ten).

**NOTE:** You may have a surprise/hurt response to the long needle penetrating the thigh/buttock and respond by jerking or pulling the needle out, resulting in the medication being expelled outside of the injection site. If so, obtain another atropine autoinjector and repeat the process.

(9) Remove the atropine autoinjector from the injection site by pulling it out at a 90° angle.

(10) Place the used autoinjector carefully between two fingers of the hand holding the plastic clip (see figure 8-6 A).

(11) Grasp the large (2-PAM chloride) autoinjector remaining in the clip with the thumb and two fingers without covering or holding the needle (black) end (figure 8-6 B). Putting pressure on the black end could cause the autoinjector to function prematurely during removal.

(12) Using your thumb and two fingers, pull the 2-PAM chloride autoinjector out of the clip with a smooth motion (figure 8-6 C). This is basically the same method as used with the atropine autoinjector.

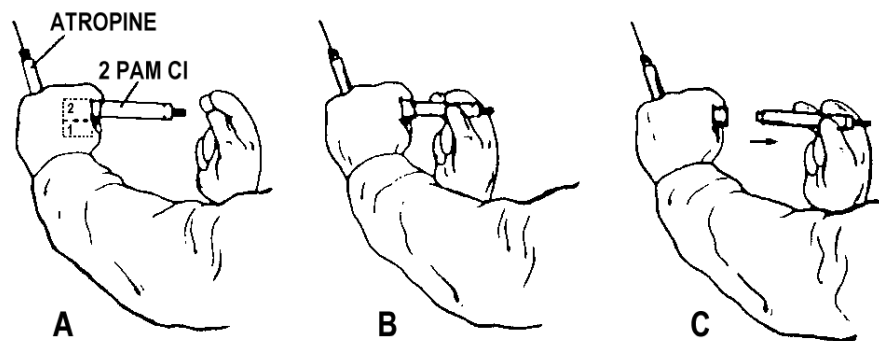


Figure 8-6. Removing the 2-PAM chloride autoinjector from the MARK I clip.

**NOTE:** You can now drop the empty plastic clip, but do not drop the used atropine autoinjector.

(13) Form a fist around the autoinjector with the needle end (black) extending beyond the little finger end of the fist.

**NOTE:** If you accidentally cause the autoinjector to function or accidentally inject yourself in the hand, obtain another 2-PAM chloride autoinjector and use it to inject yourself in the thigh/buttock.

(14) Place the black (needle) end against the injection site at a 90° angle.

(15) Apply firm, even pressure to the autoinjector until it functions. Push the autoinjector hard into the muscle to ensure that the needle penetrates both the clothing and skin. Firm pressure automatically triggers the coiled spring mechanism which plunges the needle into the muscle and forces fluid through the needle into the muscle tissue.

(16) Hold the injector firmly against the muscle for at least 10 seconds.

(17) Remove the 2-PAM Cl autoinjector from the injection site by pulling it out at a 90° angle.

**NOTE:** Do not drop the used autoinjectors. If you have not already dropped the empty plastic clip, drop it at this time.

**e. Administer the Antidote Treatment-Nerve Agent Autoinjector, If Used.**  
Follow these instructions if you are issued the ATNAA instead of the MARK I.

(1) Remove the autoinjector from the pouch.

(2) With your dominant hand, hold the ATNAA in your closed fist with the green needle end extending beyond the little finger in front of you at eye level.

(3) With your nondominant hand, grasp the safety (gray) cap with the thumb and first two fingers.

**CAUTION:** Do not cover or hold the needle end with your hand, thumb, or fingers. You may accidentally inject yourself.

**NOTE:** If you accidentally cause the autoinjector to function or accidentally inject yourself in the hand, obtain another ATNAA autoinjector and use it to inject yourself in the thigh/buttock.

(4) Pull the safety cap off the bottom of the injector with a smooth motion and drop it to the ground.

(5) Make sure the injection site is cleared of any objects that could interfere with the injection. If the injection site is in the thigh, grasp the trouser cargo pocket with

your nondominant hand and pull forward, clearing possible obstructions from the site. If you are going to give the injection in your buttock, lift the flap of your jacket if it is covering the injection site. Avoid the mask carrier, straps, buttons, or other possible problems.

(6) Hold the ATNAA autoinjector in your closed fist with the green needle end pointing out by your little finger.

(7) Place the needle end of the autoinjector against the injection site at a 90° angle.

(8) Push the autoinjector into the muscle with firm, even pressure until the needle functions. Do not use a jabbing motion.

(9) Hold the autoinjector firmly in place for at least 10 seconds to ensure that all of the nerve agent antidotes are injected into the muscle.

(10) Remove the autoinjector from the injection site by pulling it out at a 90° angle.

f. **Secure Used Autoinjector(s).** Attach the used autoinjector(s) to your clothing. If you need additional treatment, the used autoinjectors will let the medic or fellow soldier (buddy-aid) know that you have taken nerve agent antidote and how much you have taken. Take care to avoid tearing your protective garments/gloves with the needle.

(1) Use a hard surface to bend the needle to form a hook without tearing the protective gloves or clothing.

**NOTE:** This step is necessary because there is too much of a chance of puncturing the protective gloves and/or skin if you try to bend the needle as you attach it to the MOPP suit.

(2) Push the bent needle of the used autoinjectors (one at a time if more than one) through the pocket flap of the protective overgarment (figure 8-7).

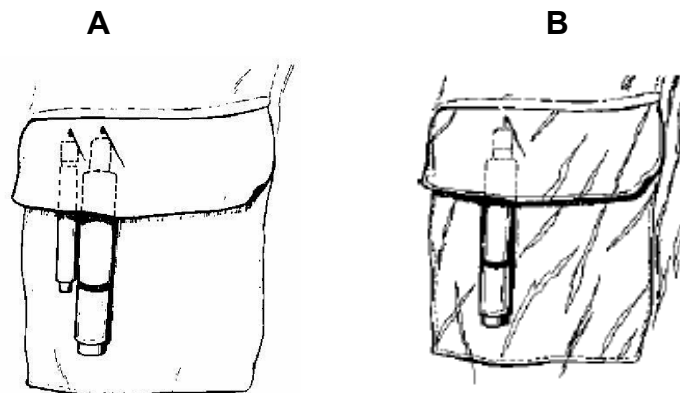


Figure 8-7. Used autoinjector(s) attached to pocket flap.  
A. MARK I atropine and 2-PAM Cl. B. ATNAA.

## 8-8. DECONTAMINATE EXPOSED SKIN

After you have masked and given yourself nerve agent antidote (if needed), decontaminate any skin that was exposed to the nerve agent. The M291 skin decontaminating kit (figure 8-8) is provided to service members for skin decontamination. This kit may also be used to decontaminate selected individual equipment, such as load bearing equipment, protective gloves, mask, hood, and weapon.

**NOTE:** The M291 kit is for external use only. Keep decontaminating powder out of the eyes; it may be slightly irritating to the eyes. Decontaminate eyes by flushing them with water.



Figure 8-8. M291 Skin Decontaminating Kit.

**NOTE:** A 0.5 percent chlorine bleach solution can also be used to decontaminate cuts and wounds if the kit is not available.

a. **Obtain M291 Kit.** Remove the M291 skin decontamination kit from your mask carrier.

b. **Decontaminate Your Hands.**

(1) Remove one skin decontaminating packet from the carrying pouch. Tear the packet open quickly at the notch. Although any notch may be used to open the packet, opening at the TEAR LINE will place applicator pad in a position that is easier to use.

(2) Remove the applicator pad from packet and discard the empty packet.

(3) Unfold the applicator pad and slip your finger(s) into the handle.

(4) Thoroughly scrub the exposed skin on your hands (back of hand, palm, and fingers) until they are completely covered with black powder from the applicator pad.

**c. Decontaminate Your Face.**

(1) Thoroughly scrub the exposed skin of your face until the exposed skin is completely covered with black powder from the applicator pad.

(2) Hold your breath and close your eyes.

(3) Grasp the mask beneath your chin and pull the hood and mask away from chin enough to allow one hand between the mask and the face. Hold mask in this position until you discard the applicator pad.

(4) Scrub up and down across the face, beginning at front of one ear to the nose and then to the other ear.

(5) Scrub across the face to the corner of the nose.

(6) Scrub an extra stroke at the corner of the nose.

(7) Scrub across the nose and tip of the nose to the other corner of the nose.

(8) Scrub an extra stroke at the corner of the nose.

(9) Scrub across the face to the other ear.

(10) Scrub across the cheek to the corner of the mouth.

(11) Scrub an extra stroke at the corner of the mouth.

(12) Scrub across the closed mouth to the center of the upper lip.

(13) Scrub an extra stroke above the upper lip.

(14) Scrub across the closed mouth to the other corner of the mouth.

(15) Scrub an extra stroke at the corner of the mouth.

(16) Scrub across the cheek to the end of the jawbone.

(17) Scrub across the under part of the jaw to the chin.

(18) Scrub an extra stroke at the center of the chin.

- (19) Scrub across the under jaw to the end of the jawbone.
- (20) Turn your hand out and quickly wipe the inside of the mask that touches the face.
- (21) Discard the applicator pad.
- (22) Immediately seal the mask, then clear and check it.

**d. Decontaminate Your Neck.**

- (1) Remove a second skin decontaminating packet from the carrying pouch.
- (2) Tear the packet open quickly at the notch.
- (3) Remove the applicator pad from packet and discard the empty packet.
- (4) Without breaking the seal between the face and mask, thoroughly scrub the skin of the neck and ears until they are completely covered with black powder.

**e. Redo Your Hands**

- (1) Continuing to use the same pad, redo your hands until they are completely covered with black powder.
- (2) Discard the applicator pad.

**8-9. CONTINUE PROTECTIVE MEASURES**

- a. Put on the rest of your protective clothing (MOPP level 4). Liquid nerve agents penetrate ordinary clothing rapidly.
- b. Bury the used decontamination pads if circumstances permit.
- c. Seek aid. If you have been exposed to a sufficient amount of nerve agent, you may become unable to administer additional treatment to yourself. If so, you will need someone else (a buddy, a combat lifesaver, or a medic) to administer additional treatment.
- d. Administer an additional NAAK, if needed. If medical assistance is not available, 10 to 15 minutes have passed since you gave yourself the NAAK injection(s), and the signs and symptoms of nerve agent poisoning persist, then self-administer a second NAAK to yourself using the same procedures as for the first NAAK.

**CAUTION:** If, within five minutes after administration of any set of injections, your heart beats very rapidly and your mouth becomes very dry, **DO NOT** give yourself another injection. You have already given yourself enough antidote to overcome the agent.

**NOTE:** If you are able to walk without assistance, know who you are and where you are, you do not need a second set of injections. Giving yourself unneeded injections may create a nerve agent antidote overdose that could cause you to be incapacitated.

**NOTE:** When you are no longer in a chemical environment, you can remove the powder from the M291 decontamination kit with soap and water when operational conditions permit. It does not matter how long the powder stays on the skin.

## **Section II. BUDDY-AID**

### **8-10. ASSISTING A SOLDIER WITH NERVE AGENT POISONING**

A soldier showing signs of mild nerve agent poisoning is probably capable of administering first aid to himself. These signs and symptoms are given in paragraph 8-2 of this lesson. The soldier may still require some assistance in decontaminating himself or putting on his protective gear. However, a soldier with severe nerve agent poisoning will not be capable of helping himself and must rely on others to administer appropriate care.

### **8-11. SIGNS AND SYMPTOMS OF SEVERE NERVE AGENT POISONING**

If a soldier is exposed to sufficient amounts of nerve agent poisoning when he is not wearing his mask or protective clothing, the nerve agent can produce death within minutes. Therefore, speed is essential in recognizing and treating a soldier with severe nerve agent poisoning. Signs and symptoms of severe nerve agent poisoning include the following.

- a. Strange or confused behavior.
- b. Increased wheezing, gurgling sounds, and increased difficulty in breathing.
- c. Severely pinpointed pupils.

**NOTE:** If the nerve agent is ingested or enters through the skin, the pupils do not become pinpointed. Therefore, the lack of pinpointed pupils is no proof that the casualty is not suffering from nerve agent poisoning.

- d. Red eyes with tearing (if agent contacted eyes).

- e. Vomiting.
- f. Severe muscular twitching and general weakness.
- g. Involuntary urination and defecation (loss of bladder and bowel control).
- h. Convulsions.
- i. Unconsciousness
- j. Respiratory failure (breathing stops).

## **8-12. ADMINISTERING BUDDY-AID TO A SEVERE NERVE AGENT CASUALTY**

If you are not protected from the nerve agent, first put on your protective mask and hood and, if needed, administer one set of nerve agent antidote to yourself before rendering buddy-aid.

### **a. Position the Casualty on His Back.**

(1) Stand near the casualty's head and left shoulder, facing the casualty's feet.

**NOTE:** As some casualties will be moving or flailing about, approaching from the casualty's head and left shoulder will help to protect you from accidental injury.

(2) Squat low, facing the casualty's feet.

**CAUTION:** DO NOT KNEEL. Kneeling increases the hazard of contamination through your protective clothing.

(3) If the soldier is lying on his front, roll him so that the casualty is on his back.

**b. Mask the Casualty.** If the casualty is not masked, put the casualty's protective mask on him. If the casualty is wearing his mask, make sure that the mask is correctly sealed. The procedures below assume that the casualty is not masked.

(1) Open the casualty's mask carrier and remove the protective mask.

(2) Hold the mask so that the lenses are facing you.

(3) Open the mask by placing your fingers inside the mask and thumbs outside the cheek pouches.



- (4) Spread the mask open (figure 8-9) and position it on the casualty's chin.
- (5) Position your thumbs through the two bottom straps of the head harness. Then cup the casualty's head with the fingers of both hands and lift slightly.

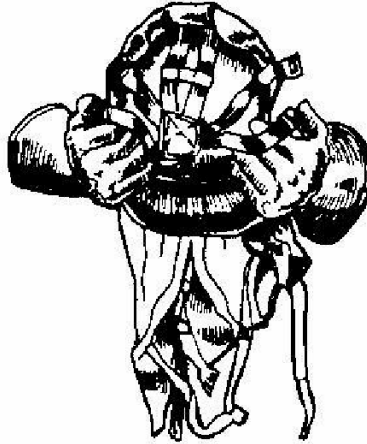


Figure 8-9. Masking a casualty.

- (6) Move your thumbs back and down behind the casualty's head, making sure the two bottom straps of the head harness are placed below the ears of the casualty. Make sure the center pad is centered in the middle of the back of the head.
- (7) If the casualty is able to follow directions, instruct him to clear the mask.
- (8) Check for a complete seal of mask by covering the inlet valves on the casualty's mask and having the casualty inhale. The mask will collapse if properly fitted, indicating a good seal.

**NOTE:** There is no way for a soldier to ensure that a non-breathing casualty's mask has a good seal.

- (9) Pull the protective hood over the head, neck, and shoulders of the casualty. If time permits, close the zipper and tighten the drawstring.

c. **Position the Casualty on His Side.** Position the casualty on his the right side, similar to a swimmer position, with head slanted down so that the casualty will not roll back over. If vomiting occurs, the matter will be caught in the mask. This position also gives you access to both injection sites (thigh and buttock).

d. **Administer Nerve Agent Antidote Kit Injections.** A casualty with severe nerve agent poisoning should receive all three of the NAAKs that he carries.

- (1) Position yourself near the casualty's thigh.

(2) Remove the casualty's three NAAKs and convulsive antidote, nerve agent (CANA) from his mask carrier or other location and place them on the casualty. Do not place them on the ground. See figure 8-10 for an illustration of a CANA autoinjector.



Figure 8-10. Convulsive antidote, nerve agent (CANA) autoinjector

**NOTE:** Use the casualty's NAAK and CANA, not yours. You may need your NAAKs and CANA for yourself at a later time.

**NOTE:** If the casualty does not have three sets, check his clothing to see if he has already administered a set to himself (autoinjectors hooked on pocket flap or used injectors lying on ground). Also check the ground for unused autoinjectors (he may have been overcome while attempting to administer antidote to himself).

(3) Select the injection site. The injection site will normally be on the casualty's thigh. If the soldier has an extremely thin lateral thigh muscle, administer the antidote in the upper, outer quadrant of the casualty's buttock to avoid injury to the thigh bone. Choose the location using the same procedures as for self-aid.

(4) Administer the first NAAK (Mark I or ATNAA) using the same procedures as used for self-aid (figure 8-11). Be sure the needle does not strike buttons or objects in the casualty's pocket. Be sure to leave the needle in the injection site for at least 10 seconds.



Figure 8-11. Administering nerve agent antidote to a casualty. (Left--using the thigh. Right--using the buttock.)

(5) Place the used autoinjector(s) on the casualty.

**NOTE:** The used autoinjectors will be attached to the casualty's clothing, but not until all autoinjectors have been administered. There is no waiting period between the injection of the first set and the injection of the second and third sets and the CANA.

(6) Administer the second NAAK and place the used injector(s) on the casualty.

(7) Administer the third NAAK and place the used injector(s) on the casualty.

(8) Administer the CANA autoinjector and place the used injector on the casualty.

(a) Tear open the protective plastic packet and remove the injector.

(b) Grasp the injector so that the needle (black) end extends beyond the thumb and index finger.

(c) With your other hand, pull the safety cap off the base of the autoinjector. The autoinjector is now armed and ready to use.

(d) Place the black end of the autoinjector against the casualty's injection site. The autoinjector should be perpendicular (90° angle) to the injection site.

(e) Inject the casualty by applying firm pressure to injector until it pushes the needle into the injection site. Hold the injector in place for at least 10 seconds. DO NOT use jabbing motion when injecting. It may result in injury to the casualty.

(f) Carefully pull the autoinjector straight out from the injection site. Massage the site if time permits.

**NOTE:** Convulsive antidote, nerve agent is part of buddy-aid, but not self-aid. If you are able to administer CANA to yourself, you do not need it.

**NOTE:** The autoinjectors (NAAK and CANA) are administered one after another. There is no break between injections.

(9) Gather the used autoinjectors and attach them onto the casualty's clothing (figure 8-12) using the same procedures as used for self-aid.

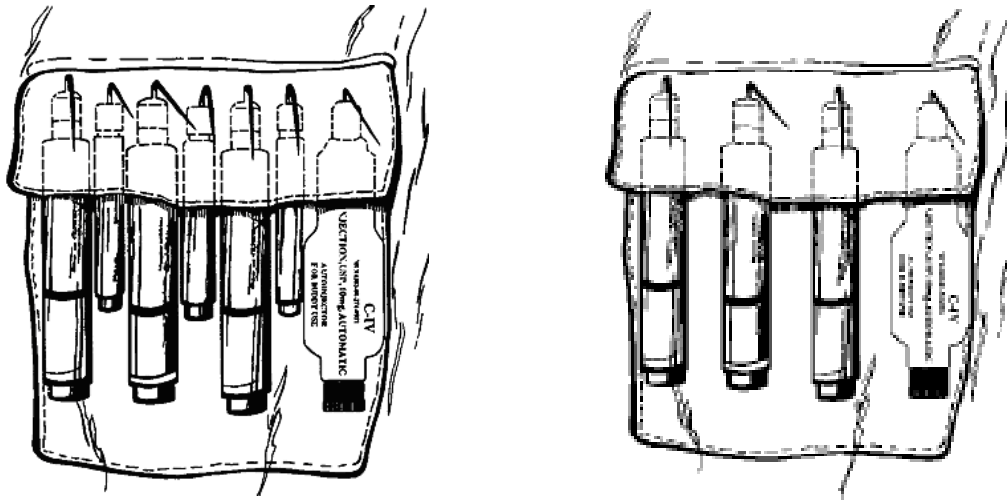


Figure 8-12. Used autoinjectors attached to a casualty's pocket flap.  
(Left--3 atropine, 3 2-PAM Cl, 1 CANA; Right--3 ATNAA, 1 CANA.)

e. **Perform Other Protective Measures.** Decontaminate the casualty's exposed skin with his M291 skin decontaminating kit. Use the procedures previously described. Place protective clothing (MOPP gear) on the casualty.

f. **Seek Medical Help.** If you have not already sent someone to get medical help for the casualty, do so now or seek medical help for the casualty yourself. The combat medic has additional atropine and CANA should the casualty need additional injections.

## LESSON EXERCISES: LESSON 8

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. Your unit is on patrol. Suddenly, you have a headache, blurred vision, tightness in your chest, and are starting to drool. These signs and symptoms indicate that you have been exposed to a(n) \_\_\_\_\_
  
2. When you suspect the presence of a nerve agent, you should first:
  - a. Give the alarm by verbally yelling "Gas!"
  - b. Take a deep breath and put on your mask.
  - c. Stop breathing and put on your mask.
  - d. Check your buddy to see if he is having signs of nerve agent poisoning.

3. You are administering self-aid to yourself after being exposed to nerve agent. In which order should you perform the following: administer nerve agent antidote, decontaminate exposed skin, and don your mask and hood.
- a. Administer nerve agent antidote; decontaminate exposed skin; don mask and hood.
  - b. Administer nerve agent antidote; don mask and hood; decontaminate exposed skin.
  - c. Don mask and hood; administer nerve agent antidote; decontaminate exposed skin.
  - d. Don mask and hood; decontaminate exposed skin; administer nerve agent antidote.
  - e. Decontaminate exposed skin; don mask and hood; administer nerve agent antidote.
  - f. Decontaminate exposed skin; administer nerve agent antidote; don mask and hood.
4. You are masked and in full MOPP, but two fellow soldiers have removed their masks. Suddenly, someone yells "Gas." The two soldiers put on their masks, but quickly become ill. Soldier A has nausea, runny nose, a sudden headache, and stomach cramps. Soldier B is acting confused, has trouble breathing, makes noises when he breathes, has jerky movements in his limbs, and has urinated on himself.
- a. Soldier A is probably suffering from \_\_\_\_\_.
  - b. Soldier B is probably suffering from \_\_\_\_\_.
  - c. Which soldier should you assist first? \_\_\_\_\_.

5. You are administering buddy-aid to a nerve agent casualty. In which order should you perform the following: administer nerve agent antidote, decontaminate exposed skin, and put on casualty's mask.
- Administer nerve agent antidote; decontaminate exposed skin; put on casualty's mask.
  - Administer nerve agent antidote; put on casualty's mask; decontaminate exposed skin.
  - Put on casualty's mask; administer nerve agent antidote; decontaminate exposed skin.
  - Put on casualty's mask; decontaminate exposed skin; administer nerve agent antidote.
  - Decontaminate exposed skin; put on casualty's mask; administer nerve agent antidote.
  - Decontaminate exposed skin; administer nerve agent antidote; put on casualty's mask.
6. Your squad had been attacked by chemical agent artillery. You have masked and decontaminated yourself. A fellow soldier had trouble masking himself. By the time he masked, he was having difficulty breathing. He removed a NAAK from his mask carrier, but collapsed before he could administer it to himself. The ATNAA autoinjector is lying on the ground. What should you do?
- Administer the ATNAA autoinjector that is lying on the ground; then evaluate the casualty to see if additional antidote is needed.
  - Ignore the ATNAA on the ground since it is contaminated. Remove another NAAK from the casualty's mask carrier and administer it. Then evaluate the casualty to see if additional antidote is needed.
  - Administer three ATNAA autoinjectors (the dropped one and two from his mask carrier). Then evaluate the casualty to see if CANA is needed.
  - Administer three ATNAA autoinjectors (the dropped one and two from his mask carrier) plus the CANA from his mask carrier.
  - Administer three ATNAA autoinjectors (two from his mask carrier and one from your mask carrier) plus the CANA from his mask carrier.

7. You are going to don an M40-series protective mask. Which one of the following is/are a proper procedure?
- a. Put your helmet between your thighs before putting on the mask.
  - b. Hold your rifle between your thighs and place your helmet on the muzzle.
  - c. Remove and store your glasses before you don the mask.
  - d. All of the above are correct procedures.

8. You have put on your protective mask. What else should you do before you resume breathing?
- a. Clear the mask.
  - b. Check the mask.
  - c. Clear and check the mask.

9. You are going to put a soldier's mask on him. How should you be holding the mask?

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10. Before you mask a casualty, you should place him on his:
- a. Back.
  - b. Front.
  - c. Left side.
  - d. Right side.



11. Before you administer NAAK a casualty, you should place him on his:
  - a. Back.
  - b. Front.
  - c. Left side.
  - d. Right side.
  
12. Which is the preferred location for administering an ATNAA autoinjector to yourself?
  - a. Thigh.
  - b. Buttock.
  
13. You are going to administer an atropine autoinjector from a MARK I kit into a casualty's buttock. Where should the injection site be?
  - a. In the center of the buttock.
  - b. In the upper, outer quadrant.
  - c. In the upper, inner quadrant.
  - d. in the lower, inner quadrant.
  - e. In the lower, outer quadrant.
  
14. You are going to give yourself an injection with an 2-PAM CI autoinjector. How should it be administered?
  - a. Press on the black end to release the needle; stick yourself with a jabbing motion, press on the other end to begin administering the medication.
  - b. Place the black end against the injection site and apply firm, even pressure to the autoinjector until it functions.

15. You are administering ATNAA to a casualty. How long should you leave the needle of the autoinjector in the casualty's muscle?
  - a. Two to three seconds.
  - b. Five seconds.
  - c. Ten seconds.
  - d. Twenty seconds.
  
16. You have administered a NAAK to yourself. How long should you wait before you administer a second NAAK?
  - a. You don't wait. Administer the second and third NAAK immediately.
  - b. Three to five minutes.
  - c. At least ten minutes.
  - d. At least twenty minutes.
  
17. You are going to administer a Mark I NAAK to yourself. Which autoinjector do you administer first?
  - a. Small (atropine) autoinjector.
  - b. Large (2-PAM chloride) autoinjector.
  
18. Which is the preferred location for administering a CANA to a casualty?
  - a. Thigh.
  - b. Buttock.

19. You have administered a NAAK to a casualty with severe nerve agent poisoning. How long should you wait before you administer a second NAAK?
- a. You don't wait. Administer the second and third NAAK immediately.
  - b. Three to five minutes.
  - c. At least ten minutes.
  - d. At least twenty minutes.
20. When administering CANA, the autoinjector should be:
- a. Perpendicular to the injection site.
  - b. At a 45° angle to the injection site.
  - c. At about a 10° angle to the injection site.
21. You have given yourself a Mark I NAAK. Your mouth is now very dry and your heart is beating rapidly. What should you do now?
- a. Administer another atropine autoinjector.
  - b. Administer another 2-PAM Cl autoinjector.
  - c. Administer another atropine autoinjector and another 2-PAM Cl autoinjector.
  - d. Do not administer additional NAAK; you have received sufficient antidote.

22. Your face, neck, and hands were contaminated with nerve agent. You are going to decontaminate using your M291 kit. In what sequence should you decontaminate your skin?

- a. Face, neck, hands.
- b. Hands, face, neck.
- c. Neck, hands, face.
- d. Hands, face, neck, hands.
- e. Hands, neck, face, hands.

23. You are going to decontaminate your face with M291 kit. Before you lift your mask, you should \_\_\_\_\_ and

\_\_\_\_\_ .

## SOLUTIONS TO LESSON EXERCISES: LESSON 8

1. Nerve agent (para 8-2)
2. c (para 8-3)
3. c (paras 8-4, 8-7, 8-8)
4. a. Mild nerve agent poisoning (para 8-2)  
b. Severe nerve agent poisoning (para 8-11)  
c. Soldier B (para 8-10)
5. c (paras 8-12b, d, e)
6. d (paras 8-12d, d(2), d(2) Notes, d(8))
7. d (paras 8-4b, c)
8. c (paras 8-4 f, g, h)
9. Hold the mask so that the lenses are facing you, your fingers are inside the mask, and your thumbs are outside the cheek pouches. (para 8-12b(2), (3))
10. a (paras 8-12a, b)
11. d (para 8-12c, fig 8-11)
12. a (para 8-7b(1))
13. b (paras 8-12d(3), 8-7b(2))
14. b (paras 8-7d(11) through (15))
15. c (paras 8-12d(4), 8-7e(9))
16. c (para 8-9d)
17. a (para 8-7 d(2), fig 8-5)
18. a (paras 8-12d(3), 8-7b(1))
19. a (para 8-12d(5) Note)

20. a (para 8-12d(8)(d))
21. d (para 8-9d Caution)
22. d (paras 8-8b, c, d, e)
23. Hold your breath; Close your eyes. (para 8-8c(2))

## LESSON ASSIGNMENT

### LESSON 9

Preventing/Treating Environmental Injuries.

### LESSON ASSIGNMENT

Paragraphs 9-1 through 9-19.

### LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 9-1. Identify signs and symptoms of heat injuries.
- 9-2. Identify measures to prevent heat injuries.
- 9-3. Identify measures to treat heat injuries.
- 9-4. Identify signs and symptoms of cold injuries.
- 9-5. Identify measures to prevent cold injuries.
- 9-6. Identify measures to treat cold injuries.
- 9-7. Identify preventive measures against arthropods and arthropod-borne diseases.
- 9-8. Identify preventive measures against water-borne and food-borne diseases.
- 9-9. Identify appropriate waste disposal methods.
- 9-10. Identify preventive measures against hearing loss.
- 9-11. Identify measures to maintain personal hygiene including skin care, foot care, and oral hygiene.
- 9-12. Identify preventive measures against respiratory disease.
- 9-13. Identify preventive measures against sexually transmitted diseases and HIV.
- 9-14. Identify effects of tobacco use.

**REFERENCES**

STP 21-1-SMCT, Soldier's Manual of Common Tasks:  
Skill Level 1.

FM 4-25.11, First Aid.

FM 21-10, Field Hygiene and Sanitation.

AR 600-63, Army Health Promotion.

**SUGGESTION**

After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.



## LESSON 9

### PREVENTING/TREATING ENVIRONMENTAL INJURIES

#### Section I. HEAT INJURIES

##### 9-1. CAUSES OF HEAT INJURIES

Heat injuries usually occur during hot weather or when a person is working near equipment that produces heat. However, heat injuries can also occur during temperate conditions. Heat injury can occur whenever the normal temperature control mechanisms of the body are overwhelmed. This may occur when fluids are not adequately replaced, soldiers are not adequately rested, or body heat is not adequately dissipated. Even a healthy person can suffer heat injury. Heat injuries can be painful and, in some cases, fatal.

##### 9-2. TYPES OF HEAT INJURES

The three principal types of heat injuries are heat cramps, heat exhaustion, and heat stroke.

a. **Heat Cramps.** Heat cramps are painful muscle spasms (contractions) caused by loss of water and salt from the body, usually through perspiration. Signs and symptoms of heat cramps include:

- (1) Grasping or massaging an arm or leg.
- (2) Bending over in an effort to relieve the pain of an abdominal cramp.
- (3) Skin excessively wet with perspiration.
- (4) Unusual thirst.

b. **Heat Exhaustion.** Heat exhaustion is primarily caused by the body losing water, usually through perspiration, without the water being adequately replaced. Heat exhaustion usually occurs in fit individuals who are involved in extreme physical exertion in a hot environment and are not acclimatized. The signs and symptoms of heat exhaustion are very similar to those of shock. The first five signs and symptoms listed are the most common.

- (1) Profuse sweating with pale, moist, cool skin.
- (2) Headache.
- (3) Weakness.

- (4) Dizziness.
- (5) Loss of appetite.
- (6) Heat cramps.
- (7) Nausea, with or without vomiting.
- (8) Urge to defecate.
- (9) Chills (goose flesh).
- (10) Rapid breathing.
- (11) Tingling of the hands and/or feet.
- (12) Confusion.

c. **Heatstroke.** Heatstroke (also called sunstroke) usually occurs in people who work in a very hot, humid environment for a prolonged period of time. In heatstroke, the body's temperature regulating system fails and the body's internal (core) temperature increases to dangerous levels. Heat stroke is a medical emergency that can be fatal if the casualty's body is not cooled quickly. The following are signs and symptoms of heat stroke.

- (1) Flushed, hot, dry skin (lack of perspiration).
- (2) Headache.
- (3) Dizziness.
- (4) Nausea.
- (5) Confusion.
- (6) Weakness.
- (7) Loss of consciousness.
- (8) Seizures.
- (9) Weak and rapid pulse.
- (10) Weak and rapid breathing.

### 9-3. PREVENTING HEAT INJURIES

Some of the preventive medicine measures (PMM) for protection against heat injuries are given below.

a. Drink sufficient amounts of water. Your body needs a minimum amount of water for cooling, waste elimination, and metabolism. Any attempt to train the body to use less water can be harmful and may lead to heat injuries.

(1) Hourly fluid intake should not exceed 1 ½ quarts of water every hour. Daily fluid intake should not exceed 12 quarts. If your urine is dark yellow, you are not drinking enough water.

(2) Fluid intake needs will vary depending on type of work and temperature. See Table 9-1 for recommended fluid intake based upon the wet bulb, globe, temperature (WBGT) index and work performed.

(3) Drink extra water before combat operations. Being well hydrated will help you to be physically strong and mentally sharp.

(4) Maintain excess water in your system for strength and alertness.

(5) Protect yourself from dehydration and heat injuries associated with wearing full chemical protective gear.

b. Rest whenever possible.

(1) Take rest breaks in accordance with the heat condition table (table 9-1) as the tactical situation permits.

(2) Use rest breaks to drink water and to cool off. If possible, rest in a shady area.

c. Eat regular meals daily to replace salt lost through heavy sweating. Eat something at each meal, even if you are not hungry.

**NOTE:** Usually, eating field rations or liberal salting of the garrison diet will provide enough salt in your diet. Excess intake of salt should be avoided.

d. Protect yourself from exposure.

(1) Wear your uniform properly (loose-fitting).

(2) Work in the shade whenever possible.

(3) Use barrier creams and lotions.

<b>Fluid Replacement Policy for Warm Weather</b> (Average acclimated soldier wearing BDU, Hot Weather)							
		Easy Work <sup>1</sup>		Moderate Work <sup>1</sup>		Hard Work <sup>1</sup>	
HEAT CATEGORY	WBGT INDEX, °F*	Work/Rest**	Water Intake, Qt/hr**	Work/Rest**	Water Intake, Qt/hr**	Work/Rest**	Water Intake, Qt/hr**
1	78 - 81.9	NL***	1/2	NL***	3/4	40/20 min	3/4
2 (Green)	82 - 84.9	NL***	1/2	50/10 min	3/4	30/30 min	1
3 (Yellow)	85 - 87.9	NL***	3/4	40/20 min	3/4	30/30 min	1
4 (Red)	88 - 89.9	NL***	3/4	30/30 min	3/4	20/40 min	1
5**** (Black)	90 or more	50/10 min	1	20/40 min	1	10/50 min	1

<sup>1</sup> See Table 9-2 for examples of work categories.

\* Wearing body armor adds 5 units to the WBGT Index. Wearing all MOPP overgarments adds 10 units to the WBGT Index.

\*\* Work/rest times and fluid replacement volumes (in quarts per hour) will sustain performance and hydration for at least 4 hours of work in the specified heat category. Rest means minimal physical activity (sitting or standing) and should be accomplished in shade if possible. Individual water needs will vary  $\pm \frac{1}{4}$  quarts per hour. Hourly fluid intake should not exceed  $1 \frac{1}{2}$  quarts. Daily fluid intake should not exceed 12 quarts.

\*\*\* NL = no limit to work time per hour.

\*\*\*\* Suspend physical training and strenuous activity. If an operational (nontraining) mission requires strenuous activity, enforce water intake to minimize expected heat injuries.

Table 9-1. Table for determining rest and water intake requirements.

## EXAMPLES OF WORK

EASY	MODERATE	HARD
Weapon maintenance.	Walking on loose sand at 2.5 mph, no load.	Walking on loose sand at 2.5 mph with load.
Walking on hard surface at 2.5 mph, 30-lb load or less.	Walking on hard surface at 3.5 mph, less than a 40-lb load.	Walking on hard surface at 3.5 mph, 40-lb load or more.
Manual of arms.		
Marksmanship training.	Calisthenics.	
Drill and ceremony.	Patrolling.	
	Individual movement techniques, such as low crawl, high crawl.	
	Defensive position construction.	
	Field assaults.	

Table 9-2. Example of work categories for Table 9-1.

### 9-4. TREATING HEAT INJURIES

#### a. Treating Heat Cramps.

(1) Move the casualty to a cool, shaded area to rest. If there is no shade available, improvise a shade using ponchos, blankets, or other available materials.

(2) Loosen the casualty's clothing around his neck and waist and loosen his boots.

### WARNING

Do not loosen the casualty's clothing or boots if you are in a chemical environment.

(3) Have the casualty slowly drink one quart (one canteen) of cool water.

**NOTE:** Drinking the water too rapidly may cause the casualty to vomit, thus losing even more fluid from the body.)

(4) If cramps continue, seek medical help or evacuate the casualty as soon as possible. If the casualty improves, have him continue with fluid replacement as indicated for the climate and environment. Even if the casualty improves, he should be evaluated by the combat medic.

#### **b. Treating Heat Exhaustion.**

(1) Move the casualty to a cool, shaded area to rest. If there is no shade available, improvise a shade using ponchos, blankets, or other available materials.

(2) Loosen or remove the casualty's boots and clothing around his neck and waist.

(3) Have the casualty lie on his back and elevate his legs (normal shock position). His ankles and/or feet should be supported by a stable object such as a pack or log. The shock position helps blood to return from the legs to the heart.

(4) Pour water over the casualty and fan him. This will help to cool his body faster.

#### **WARNING**

Do not loosen or remove the casualty's clothing or boots or pour water on the casualty if you are in a chemical environment.

(5) Have the casualty slowly drink at least a canteen (one quart) of cool water.

(6) Monitor the casualty. When possible, seek medical aid.

**NOTE:** If possible, the casualty should not participate in strenuous activity for the remainder of the day.

#### **c. Treating Heatstroke.**

(1) Move the casualty to a cool, shaded area to rest. If there is no shade available, improvise a shade using ponchos, blankets, or other available materials.

- (2) Loosen or remove the casualty's boots and clothing unless in a chemical environment.
- (3) Spray or pour water on the casualty and fan him unless in a chemical environment.
- (4) Massage the casualty's arms and legs unless in a chemical environment.
- (5) Have the casualty lie on his back and elevate his legs (normal shock position).
- (6) If the casualty is conscious, have him slowly drink at least a canteen (one quart) of cool water.
- (7) Monitor the casualty closely for life-threatening conditions. When possible, seek medical aid and evacuate the casualty.

### **WARNING**

Heatstroke is a medical emergency that may result in death if treatment is delayed. Start cooling measures immediately and continue while waiting for transportation and during evacuation.

## **Section II. COLD INJURIES**

### **9-5. CAUSES OF COLD INJURIES**

Cold weather operations can cause serious injury to a combat soldier. Exposure for prolonged periods to temperature at or below freezing may cause tissue damage or a general body cooling that can lead to death. Soldiers, however, may be in danger of cold injury even when the temperature is above freezing. The seriousness of the injury depends upon the weather (temperature and moisture), clothing, type of combat operation, and the physical and mental makeup of the individual soldier. Well-disciplined and well-trained soldiers can be protected even in the most adverse circumstances. Soldiers with a history of cold injury are more likely to suffer cold injuries and should take extra precautions against cold injuries. Cold injuries are most likely to occur to exposed body parts such as the cheeks, nose, ears, chin, forehead, wrists, hands, and feet.

## 9-6. TYPES OF COLD INJURES

The principle types of cold injuries are chilblains, dehydration, immersion syndrome, frostbite, snow blindness, and hypothermia.

a. **Chilblains.** Chilblain is caused by prolonged exposure of bare skin to cool or cold temperatures [50°F (10°C) or lower]. Signs and symptoms of chilblain include:

- (1) Redness or pallor of affected areas (fingers, nose, ears, and so forth).
- (2) Absence of pain (numbness) in the affected area.
- (3) Open sores or bleeding skin lesions.
- (4) Hot, tender, itching skin.

b. **Dehydration.** Dehydration is as dangerous in cold weather as in hot weather. Actually, dehydration is more common in the winter because the soldier does not feel as thirsty and, therefore, is less likely to consume adequate amounts of water. Signs and symptoms of cold weather dehydration include:

- (1) Mouth, tongue, and throat that are parched and dry.
- (2) Difficulty in swallowing.
- (3) Nausea and dizziness.
- (4) Fainting.
- (5) Feeling tired and weak.
- (6) Muscle cramps, especially in the legs.
- (7) Vision problems (may have difficulty in focusing eyes).

c. **Immersion Syndrome.** Immersion syndrome is caused by prolonged exposure (hours to days) to wet conditions at temperatures from 50°F to 32°F (10°C to 0°C). Immersion foot, trench foot, and trench hand are types of immersion syndrome injuries. Inactive feet in damp conditions, wet socks and boots, and tightly-laced boots which impair circulation make feet even more susceptible to injury. Trench foot occurred frequently during World War I as soldiers stood in cold, wet, muddy trenches for extended periods of time awaiting the order to move. Immersion syndrome can be divided into two phases. Signs and symptoms of each phase are as follows.



(1) Early stage (first phase). In this phase, the affected part is cold, numb, and without pain.

(2) Later stage (advanced phase).

(a) The limbs feel hot and burning.

(b) There are shooting pains in the affected area.

(c) The affected area is pale with a bluish cast.

(d) The pulse strength in the affected area is decreased.

(e) Blisters, swelling, redness, hemorrhages, and gangrene may be present.

d. **Frostbite**. Frostbite is caused by the freezing of water in the skin and other tissues. Frostbite occurs only when the flesh is exposed to freezing temperatures [below 32°F (0°C)]. Frostbite usually occurs in areas most likely to be exposed to cold conditions such as the cheeks, nose, ears, chin, forehead, fingers, hands, wrists, toes, and feet. The depth and the severity of the injury depend upon the temperature and the duration of exposure. The lower the temperature, the shorter the time required to produce the injury. Frostbite is generally divided into two categories--superficial and deep.

(1) Superficial frostbite. Superficial frostbite primarily involves injury to the skin and the tissue just beneath the skin. Signs and symptoms of superficial frostbite include:

(a) Loss of sensation or numb feeling in the affected body part.

(b) Sudden whitening (blanching) of the skin in the affected area followed by a momentary tingling feeling.

(c) A reddish (in light-skinned individuals) or grayish (in dark-skinned individuals) area on the skin.

**NOTE:** Freezing of superficial skin tissue may occur with superficial frostbite (frostnip); however, there is no freezing of the deeper tissues.

(2) Deep frostbite. Deep frostbite occurs when the tissues below the skin freeze. This may include the tissues of the muscles and bones. The blanching and numbness of superficial frostbite always precede the development of deep frostbite. If not properly treated, frostbite can result in the loss of fingers, toes, hands, or feet. It can also result in gangrene--a life-threatening condition. Signs and symptoms of deep frostbite include:

- (a) Blisters.
- (b) Swelling or tender areas.
- (c) Loss of previous feeling of pain in the affected area.
- (d) Pale, yellowish, waxy-looking skin.
- (e) Frozen area feels solid or wooden to the touch.

e. **Snow Blindness.** Snow blindness is a temporary loss of sight caused by ultraviolet rays from the sun reflecting off snow or ice. The condition is similar to a welding flash burn and is caused by damage to the cells covering the cornea (clear portion of the eye). Snow blindness is more likely to occur in hazy, cloudy weather than when the sun is shining. Cloudy weather reduces the amount of visible light reaching the eyes; therefore, soldiers are less likely to take proper preventive measures such as wearing sunglasses. Ultraviolet rays, however, are not visible and are not reduced by the haze or clouds. Signs and symptoms of snow blindness include:

- (1) Scratchy feeling in eyes, as if from sand or dirt.
- (2) Watery eyes.
- (3) Redness.
- (4) Headache.
- (5) Increased pain with exposure to light.

f. **Hypothermia.** Hypothermia (low body temperature) occurs when the entire body is cooling with a core temperature (measured rectally) below 95° F. It is caused by continued exposure to low or rapidly dropping temperatures, cold moisture, snow, or ice. Hypothermia can be divided into two categories--mild and severe.

### **WARNING**

Hypothermia is a medical emergency that will result in death if not treated promptly. Prompt medical treatment is necessary. Immediate evacuation is required.

(1) Mild hypothermia. In mild hypothermia, the casualty's core body temperature is 90° F to 95° F. This condition should be suspected in any chronically ill person who is found in an environment of less than 50° F. Signs and symptoms of mild hypothermia include:

- (a) Apathetic or lethargic behavior.
- (b) Shivering.
- (c) Pale, cold skin.
- (d) Slurred speech.
- (e) Poor muscle coordination.
- (f) Faint pulse.

(2) Severe hypothermia. In severe hypothermia, the casualty's core body temperature is below 90° F. Signs and symptoms of severe hypothermia include:

- (a) Slow and shallow breathing.
- (b) Irregular heart action.
- (c) Weak or absent pulse.
- (d) Stupor or unconsciousness.
- (e) Ice cold skin.
- (f) Rigid muscles.
- (g) "Glassy" eyes.

## **9-7. PREVENTING COLD INJURIES**

Cold injuries are caused by the body losing heat faster than it can be replaced. Cold injuries are most likely to occur when an unprepared person is exposed to cold winter temperatures. A person may be unaware that he is developing cold injury until it is too late. Although cold injuries are often associated with very cold weather, preventive measures against cold are needed anytime the temperature drops to 50°F or below. Wind and moisture increase the rate at which the body loses heat. Fear, fatigue, dehydration, inadequate food intake, inadequate rest, inadequate clothing, sustained contact with cold ground, and long periods of immobilization also contribute to cold injury. A soldier with a history of cold injury is especially susceptible to future cold injury. A soldier should take the following measures to help prevent becoming a cold injury casualty.

**a. Wear Clothing Properly.**

(1) Wear adequate clothing. Wear an adequate amount of properly fitting clothes as directed by your commander. Wear your gloves or mittens (with inserts) to protect your hands and wrists.

(2) Layer clothing. The clothing should be worn in loose layers. Layering clothing allows air to be trapped inside the clothing. This trapped air helps to slow down the loss of heat produced by the body. Loose clothing also helps to promote blood circulation. The blood carries oxygen and nutrients that cells need in order to produce heat.

(3) Keep clothing dry. When clothing becomes wet, it loses its ability to keep the body warm. One way that clothing becomes wet is by absorbing perspiration. You should, therefore, try to prevent excessive sweating whenever possible. If you have some hard work to do, remove a layer or two of clothing before starting the work in order to reduce sweating. When you have completed your work, replace the dry clothing that you removed.

**WARNING**

Do not remove protective clothing in a chemical environment.

(4) Keep clothing clean. Launder clothing regularly. Dirty or wet clothing adds to the cold injury process.

**b. Exercise Your Muscles.** When your body performs work, heat is produced. Exercise the large muscle groups (shoulders, trunk, and legs) to produce heat and to increase blood circulation.

(1) If your situation prevents excessive movement, change positions frequently, move your feet, wiggle your toes, and exercise your arms, hands, and fingers. Tighten and relax arm and leg muscles, fingers, and toes.

(2) Use your hands to massage and warm your face.

(3) Refrain from smoking; it restricts blood flow to the skin.

**NOTE:** Physical and mental weariness contribute to inactivity, reduced heat, and increased chance for cold injury.

c. **Change Socks.** Keep your socks clean and dry. Change wet or damp socks as soon as practical, usually during a rest break.

(1) Wet or damp socks can be dried by placing them inside your shirt. The heat from your body will dry the socks.

(2) Wash your feet daily and use foot powder.

d. **Prevent Dehydration.** Drink sufficient fluids (potable water, juices, and warm, nonalcoholic beverages). Eat meals to replace salt lost during perspiration. In cold weather, you may not realize that your body is losing fluids and salt since they are absorbed by the layers of clothing and are seldom visible on the skin. When possible, rest when performing hard work.

e. **Pair With a Buddy.** Many times it is easier to notice the first signs of frostbite, immersion syndrome, and hypothermia on someone else rather than on yourself. Because of this, soldiers should watch one another for signs of cold injury, especially frostbite of the face. If you notice signs of frostbite, have the person massage his face, put his hands under his arms for warmth, or take some other measure to counteract the frostbite. Remind each other to do warming exercises often.

## 9-8. TREATING COLD INJURIES

a. **Chilblains.** Chilblain is treated by warming the injured body part and protecting it from further injury.

(1) Apply rewarming (body heat) techniques to the affected area(s). This includes putting bare hands over the affected area on the face, putting affected hands inside the uniform under the armpits, putting bare feet against the abdomen of another soldier, etc.). If available, blow warm air on the affected area.

**CAUTION:** Do not rub or massage area. Rubbing or massaging the area may cause tissue damage.

**NOTE:** If the condition does not respond to simple care, begin treatment for frostbite.

(2) Protect lesions (if present) with dry sterile dressing.

(3) Seek medical aid for the casualty.

b. **Dehydration.**

(1) Keep the casualty warm.

(2) Loosen the casualty's clothes to improve circulation.

(3) Give the casualty fluids for fluid replacement. (Medical personnel will determine the need for salt replacement.)

(4) Have the casualty rest.

(5) Seek medical aid for the casualty.

**c. Immersion Syndrome.**

(1) Remove wet coverings and gradually rewarm the affected body parts by exposing to warm air.

(2) Protect the affected parts from trauma. Do not massage the affected areas.

(3) Dry affected feet thoroughly. Avoid having the casualty walk on affected feet.

(4) Elevate the affected part to reduce swelling.

(5) Seek medical treatment or evacuate the casualty to a medical treatment facility as soon as practical.

**d. Frostbite.** If not properly treated, frostbite can result in the loss of fingers, toes, hands, or feet. Frostbite can also result in gangrene, a life-threatening condition.

(1) Move the casualty to a sheltered area.

(2) Warm the affected area using firm, steady pressure of hands, underarm, or abdomen.

(a) For a frostbitten area on the casualty's face, ears, or nose, cover the area with your bare hands. Leave your hands in place until the pain in the frostbitten area stops and the color returns to the area. (If the casualty is able, he can use his own hands to rewarm the affected part.)

(b) For a frostbitten hand, remove jewelry from the affected hand and put it in the casualty's pocket. Loosen constricting clothing to help restore circulation. Open the casualty's field jacket and place the casualty's hand under his armpit (right hand under left armpit; left hand under right armpit). Then close the casualty's clothing to prevent additional exposure to the cold.

(c) For a frostbitten foot, remove the boot and sock from the frostbitten foot. Have another soldier (yourself if no other soldier is available) undo his clothing so that the casualty's foot (or feet) can be placed next to the soldier's abdomen. Place the casualty's frostbitten foot against the abdomen of the second soldier. Close the soldier's clothing as much as possible to provide additional warmth and protection from the cold.

(3) Cover the casualty with blankets or other dry material to keep him warm and to avoid additional injury from the cold.

(4) Have the casualty exercise as much as possible while avoiding trauma to the injured part(s).

(5) Seek medical help. If deep frostbite is present, evacuate the casualty to a medical treatment facility. If possible, use a litter or other means to evacuate the casualty that will not require him to stand or walk. Any frostbite should be evaluated by medical personnel as soon as practical.

(6) Give the casualty something warm to drink (no alcoholic beverages).

(7) Monitor the casualty for life-threatening conditions and apply appropriate first aid as necessary.

**CAUTION:**

- DO NOT** rub snow on the frostbitten part.
- DO NOT** massage or rub the frostbitten part.
- DO NOT** use dry or radiant heat to rewarm the frostbitten part.
- DO NOT** rupture blisters on the frostbitten part.
- DO NOT** use ointments or other medications on the affected part.
- DO NOT** handle the frostbitten extremity roughly.
- DO NOT** allow a thawed extremity to refreeze.
- DO NOT** allow the casualty to use alcohol or tobacco products.

## **WARNINGS**

Do not remove protective clothing in a chemical environment.

Do not attempt to thaw the casualty's feet or other seriously frozen areas if the soldier will be required to walk to a medical treatment facility. The possibility of injury from walking is less when the feet are frozen than after they have been thawed.

e. **Snow Blindness.** Snow blindness can usually be prevented by wearing regular or improvised sunglasses. To treat a casualty with snow blindness:

(1) Cover the casualty's eyes with a dark cloth.

(2) Reassure the casualty. The condition usually heals within a few days with no permanent damage.

(3) Seek medical treatment. Evacuate the casualty if possible.

f. **Hypothermia.** Hypothermia is a medical emergency. Prompt treatment is needed. Move the casualty to a sheltered area and replace wet clothing.

(1) Mild hypothermia.

(a) Rewarm the body evenly using a heat source such as a campfire or another soldier's body. Merely placing the casualty in a sleeping bag or covering with a blanket is not enough since the casualty is unable to generate sufficient body heat on his own.

(b) Keep the casualty dry and protected from the elements.

(c) Have a conscious casualty to gradually drink warm, nonalcoholic liquids.

(d) Seek medical help for the casualty immediately.

(2) Severe hypothermia.

(a) Stabilize the casualty's temperature. Apply an additional heat source. The casualty's body is not able to generate sufficient body heat and must receive warmth from another source. One method is to place the casualty in a sleeping bag with his outer clothing removed and have another soldier remove his outer clothing and get into the sleeping bag also. Cover both soldiers with additional clothing. The casualty's body will absorb the heat given off by the second soldier's body.

(b) Apply blankets and other insulation to prevent further heat loss.

(c) Evacuate to the nearest medical treatment facility as soon as possible. Evacuate the casualty even if you cannot detect respiration or a heartbeat.

(d) Monitor the casualty for life-threatening conditions such as respiratory failure.



**CAUTION:** Rewarming a severely hypothermic casualty is extremely dangerous in the field due to the possibility of complications such as rewarming shock and disturbance in the rhythm of the heartbeat.

### **Section III. OTHER PREVENTIVE MEDICINE MEASURES**

#### **9-9. ARTHROPODS AND ARTHROPOD-BORNE DISEASES**

An arthropod is a segmented invertebrate having a hard, jointed exoskeleton and paired, jointed legs. Examples of arthropods include insects such as mosquitoes, arachnids such as spiders, centipedes, and millipedes. "Arthropod-borne diseases" usually refers to diseases transmitted by true insects (such as mosquitoes, lice, and fleas) and by certain other animals that closely resemble insects (such as ticks and mites). Examples of communicable arthropod-borne diseases include malaria (transmitted by mosquitoes), yellow fever (transmitted by mosquitoes), typhus (transmitted by lice), Rocky Mountain spotted fever (transmitted by ticks), and plague (transmitted by fleas). Below are some preventive medicine measures (PMM) you can take to protect yourself from arthropods and arthropod-borne diseases.

a. **Use Insect Repellent.** One of the best ways to keep the insects from transmitting diseases to you is to keep them away by using extended-duration arthropod repellent. Some guidelines are given below.

**NOTE:** Read the instructions that accompany the repellent and follow them.

(1) Apply the arthropod repellent skin lotion to all exposed skin except your eyes, lips, and other sensitive skin.

(2) Spread the repellent lotion two inches under the edges of the battle dress uniform (BDU). This includes the wrists, ankles, and waistline.

(3) Keep the lotion away from flame or excessive heat.

(4) Wipe your hands after applying the lotion.

(5) Reapply repellent as needed.

**NOTE:** Do not wear after-shave lotion or cologne in the field. They attract biting and stinging insects.

b. **Apply Permethrin to Clothing.** The IDA kit is most effective, but permethrin is also available in aerosol formulation.

(1) Apply permethrin clothing repellent according to the product label.

(2) Apply permethrin only on fabric, not on skin.

- (3) Treat the outside of the BDU, insect headnet, and mosquito bednet.
- (4) Dry clothing (BDUs) thoroughly prior to wearing.

**CAUTIONS:** **DO NOT** apply permethrin to the skin.  
**DO NOT** treat BDUs while they are being worn.  
**DO NOT** treat underwear or inside the cap.  
**DO NOT** inhale permethrin vapors.

c. **Wear Uniform Properly.**

- (1) Tuck pant legs into boots, roll sleeves down, and close the collar.
- (2) Wear the uniform loosely.
- (3) Check your clothing frequently. Repair any tears or holes in your uniform.

d. **Take Malaria Pills.** If you are in an area where malaria may be a problem, you will be given medication to take. You will be told how many to take at one time and when to take them (usually at mealtime). This medication, commonly referred to as "malaria pills," will help to protect you from the full effects of the disease, but does not make you immune to malaria.

e. **Keep Yourself Clean.** Wash yourself daily with soap and water or as often as the tactical situation permits. Pay special attention to hairy regions of the body, including armpits and groin, where insects may deposit their eggs. Use a buddy-system to examine each other for the presence of ticks, lice, fleas, and mites. The buddy can look at hard to see areas such as the back of the head.

f. **Keep Uniform Clean.** Your uniform should be washed at least once each week to remove arthropods and their eggs. Use the supporting laundry unit if possible. If one is not available, scrub the uniform with soap and water. A good washing will eliminate ticks and mites that are on the uniform. Lice eggs in the seams of your uniform can be killed if the uniform is washed in water heated to at least 140°F.

g. **Protect Yourself When Sleeping.** When you rest at night, you don't want to be bothered by insects. Your sleep is important. Protecting yourself against biting arthropods at night includes the use of your bednet and the use of insect spray inside the bednet.

- (1) Suspend the bednet above the sleeping area.
- (2) Tuck the edges of the bednet under the sleeping pad or bag.

- (3) Treat the bednet with permethrin aerosol clothing repellent
- (4) Spray the interior space with d-phenothrin aerosol spray insecticide.

**CAUTIONS:** **DO NOT** breath vapors from the spray.  
**DO NOT** use permethrin clothing repellent or d-phenothrin aerosol spray insecticide on your skin.

## 9-10. WATER-BORNE AND FOOD-BORNE DISEASES

Diseases caused by contaminated water and food include intestinal diseases such as diarrhea and dysentery. Diarrhea is an intestinal disorder characterized by abnormally frequent and watery bowel movements. Dysentery is an infectious disease characterized by stomach pain and diarrhea with passage of mucus and blood. They can result in dehydration and even death. The most common cause of diarrhea and dysentery is food and water contaminated with human feces.

a. **Water.** Whenever possible, obtain drinking water from sources that have been approved for consumption. In the field, however, you may have to obtain water from other sources. Always assume that water from an unapproved source is contaminated and must be disinfected before drinking. The following procedures are used when disinfecting water with iodine tablets.

- (1) Fill your canteen with the cleanest, clearest water available.
- (2) Check the color of the iodine tablets in the bottle. The tablets should be uniformly steel gray in color. Discard any tablets that are not steel gray in color, that are stuck together, or that have crumbled.
- (3) Add two tablets to your one-quart canteen of water. (If you are using a two-quart canteen, add four tablets.)
- (4) Replace the cap on the canteen.
- (5) Wait five minutes for the tablets to dissolve.
- (6) Shake the canteen to mix the dissolved tablets and the water.
- (7) Disinfect the threads on the canteen.
  - (a) Loosen the cap on the canteen.
  - (b) Tip the canteen over and squeeze to allow leakage around the canteen threads to disinfect them.
  - (c) Turn the canteen upright and tighten the cap on the canteen.

(8) Wait an additional 30 minutes before drinking the water. The additional time is needed to ensure that the iodine has sufficient time to kill all of the harmful microorganisms in the water.

**NOTE:** There are other methods for purifying water, such as chlorine ampoules, tincture of iodine, and common household bleach. If none of the purifying agents are available, **boil** the water for five to ten minutes.

b. **Food Sources.** Obtain food, drink, and ice only from sources approved by the local military medical authority. Obtain food from the dining facility when possible. Do not buy food and drink from unapproved civilian sources. These sources almost never meet the high standards of the medical authority. Obtaining ice from an unapproved source is particularly dangerous because few civilian vendors disinfect their water before freezing it. As the ice melts in your glass or mouth, bacteria in the ice will become active again.

c. **Washing Your Hands.** Your hands may have collected germs from many sources (the ground, dust in the air, the latrine door, the hands of your friends, your own nose, your weapon, ammunition, and so forth.). You should spend at least 30 seconds washing your hands with soap and water. Water from your canteen can be used if other water is not available.

(1) Wash your hands after using the latrine. Pay special attention to cleaning under your fingernails.

(2) Wash your hands just before and after you eat, handle eating utensils, or handle food items.

(3) Wash your hands after smoking.

## 9-11. WASTES

### a. **Disposing of Food Wastes.**

(1) Dispose of food waste in a covered container to keep pests out and to reduce breeding areas for flies.

(2) Use plastic bags if you have dumpster-type receptacles and regular waste pick-up.

(3) Bury waste if you are in the field and do not have waste pick-up or other disposal methods available.

**NOTE:** Before burying any waste, obtain approval by contacting either the logistics or the preventive medicine section.

b. **Disposing of Human Wastes.** Use the unit latrine facilities. These facilities help control problems such as odors from human wastes and pests such as flies. They are also built to protect water sources from contamination. Handwashing devices are also provided to help prevent the spread of disease.

(1) In a bivouac of one to three days, straddle trench latrines are usually constructed. These latrines should also have handwashing devices.

(2) On a march, a cat-hole latrine may be used if other facilities are not available. The soldier digs a hole about one foot deep, uses the latrine, and immediately covers the hole with the soil that he removed from the hole.

c. **Disposing of Other Wastes.** Other wastes such as rubbish should be incinerated or buried. Usually, burial is used if the unit will be in the field for less than a week and incineration is used if the unit will be in the field for one week or longer.

## **9-12. HEARING LOSS**

You may not be able to curtail the noise in your work environment, but you can take some of the following protective measures to prevent damage to your hearing.

- a. Wear protective devices such as earplugs, ear canal caps, or earmuffs.
- b. Wear protective vehicle headgear when appropriate, such as helicopter crew helmets and armored vehicle crew helmets.
- c. Keep hearing protection devices clean to avoid ear infections.
- d. Avoid noise and/or limit the time in noise hazardous areas.

## **9-13. SKIN INFECTION**

Keeping clean is important in preventing disease. It is also important in preventing skin infections.

- a. Bathe frequently. Take a full bath at least once every week. If showers or baths are not available, wash daily using a washcloth. Be sure to wash your genital area, your armpits, your feet, and any other areas where you sweat or which become wet. These areas include between the thighs and, for females, under the breasts.
- b. Keep your skin dry. After bathing or as needed, use foot powder on your feet, especially if you have had fungal infections in the past. Use talcum powder in areas where wetness is a problem. If talcum powder is not available, use cornstarch as a substitute.

c. After a full bath or shower, change to clean clothing. The clean uniforms should fit a little loose. Loose-fitting uniforms allow for better ventilation and blood circulation. Wear the proper clothing for the environment.

**NOTE:** Do not wear nylon or silk-type undergarments. Cotton undergarments are more absorbent and allow the skin to dry.

d. Males should shave facial hair often enough to be clean shaven. This also permits a tight fit of the protective mask.

## **9-14. FOOT CARE**

Your feet play a very important role in your ability to complete your mission. Technology has made many changes in our life, but keeping your feet in good condition is as important today as it was years ago.

a. Before going on a movement, you need to select the items you will need to protect your feet. These items include:

- (1) Footgear to wear that is correctly fitted and broken in.
- (2) Good clean socks that are free of holes and knotty darns (at least five pairs).
- (3) Foot powder.

**NOTE:** If blisters, pressure spots, or infections are present, treat them before you go on the movement.

b. During movement is a bad time to have problems with your feet. Actions to take during the movement to help prevent foot problems include:

- (1) Keep your feet as dry as possible.
- (2) If your socks become damp or wet, change them for dry ones when possible.

**NOTE:** You can dry your wet socks using your body heat. Put the wet socks under your shirt around your waist.

- (3) Try to relieve pressure spots on the feet by adjusting your gear.
- (4) Dust your feet with foot powder once or twice daily.

c. Inspect your feet during rest periods. If possible, wash your feet during the noon break. Elevate your feet while resting to help reduce congestion and swelling.

d. If blisters develop, wash the blister and the surrounding area with soap and water. If the blisters are painful or if signs of infection are present (redness, throbbing, drainage, etc.), seek medical treatment.

## **9-15. ORAL HYGIENE**

Maintaining good oral hygiene helps to prevent dental diseases. Good oral hygiene can be maintained even in the field.

a. Brush your teeth after every meal if possible. Brush your teeth even if you don't have toothpaste.

b. Use dental floss at least once a day.

c. Rinse your mouth with potable water after brushing and flossing.

## **9-16. RESPIRATORY DISEASE**

Respiratory diseases are usually transmitted from person to person by discharges from the nose, mouth, throat, or lungs of an infected person. A person who sneezes or coughs throws many droplets into the air. These droplets carry disease germs that can be inhaled by another person. Sometimes, disease germs may exist on the ground until they come into contact with a person's bare skin or until they are stirred up and become airborne again. Examples of communicable respiratory diseases include the common cold, influenza (flu), pneumonia, and streptococcal throat infection (strep). Protective measures against respiratory diseases include the following.

a. Avoid close contact with soldiers who have respiratory diseases whenever possible.

b. Encourage sick soldiers to go to sick call. Once the soldier is cured, he will not transmit the disease to you.

c. Avoid using borrowed towels, caps, cigarettes, and other objects that have been handled by other people.

d. Provide an opening for fresh air into your fighting position, bunker, or shelter. Fresh air dilutes the contaminated air and carries much of the contamination away.

## **9-17. SEXUALLY TRANSMITTED DISEASES**

Sexually transmitted diseases (STD) are infections that are transmitted through sexual contact with persons who are already infected. They are also known as venereal diseases (VD) and can be spread by heterosexual sex and homosexual sex. Examples of STDs are syphilis and gonorrhea. Preventive measures are given below.

a. Use a latex prophylactic (condom) during vaginal, anal, or oral sex when there is a possibility of acquiring an infection. A condom provides reasonably good protection against venereal disease for both males and females since it provides physical separation of the sex organs. There is no other practical mechanical device that will protect females from contamination by male secretions.

b. Avoid high-risk sexual behaviors. Such behaviors include having more than one sexual partner; changing sex partners frequently; having sex with casual partners, prostitutes, or their clients; and sexual practices such as anal sex.

c. Control alcohol intake since it could affect your ability to use safe sex practices.

## **9-18. HUMAN IMMUNODEFICIENCY VIRUS**

Human immunodeficiency virus (HIV) is the virus that causes acquired immunodeficiency syndrome (AIDS). Presently, there is no cure for AIDS and no vaccine to prevent HIV infection.

a. Human immunodeficiency virus is contagious and can be spread in the same way as STDs. Measures against STDs are also used to prevent HIV infection. HIV is not transmitted through casual contact such as touching.

b. Human immunodeficiency virus can also be transmitted through needles or syringes that have been used by a person infected with HIV. The virus is passed from an infected person to another through the blood that contaminates the shared needles or syringes. Avoid using injected, nonprescribed drugs. Avoid tattoos and body piercing made with nonsterile needles.

## **9-19. TOBACCO USE**

There are programs established to help soldiers become tobacco-free. AR 600-63, Army Health Promotion and Tobacco Use, provides the policy and guidelines. Cessation programs and materials are available from your health care facility, local preventive medicine service, community agencies such as the American Cancer Society, and your local public health department.



**a. Long-term Effects of Tobacco Use.**

(1) The leading cause of death in the US is heart and blood vessel disease. The leading preventable cause underlying heart and blood vessel disease in the U.S. is tobacco use. Tobacco use is also linked to cancer, emphysema, and stroke. The use of tobacco can cause poor circulation, increase risk during surgery, and prolong the healing process.

(2) Smoking also affects the health of nonsmokers (second-hand smoke). Living in a smoking environment is linked to lung cancer, asthma attacks, low birth weight, and preterm births. Children exposed to cigarette smoke have more middle ear and respiratory infections.

(3) Some people think that using smokeless tobacco products is safer than smoking. Actually, smokeless tobacco of all types (chew, snuff, bandits) leads to the development of heart disease, various cancers, gum recession, and bone loss around the teeth. Cancers of the mouth and throat are particularly deforming and deadly.

**b. Effects on Performance.** A soldier's performance, health, and readiness are affected by tobacco use. Tobacco use:

(1) Increases number of sick call visits, especially for respiratory infections, including pneumonia.

(2) Decreases readiness.

(3) Decreases night vision.

(4) Decreases hand-eye coordination.

(5) Decreases stamina.

(6) Increases cold weather injuries.

(7) Increases overall number of injuries.

(8) Leads to addiction.

## LESSON EXERCISES: LESSON 9

**INSTRUCTIONS:** Answer the following exercises by marking the letter of the response that **best** answers the question or **best** completes the sentence or by writing the answer in the space provided.

After you have answered all of the exercises, check your answers against the "Solutions to Lesson Exercises" at the end of the exercises. For each exercise answered incorrectly, reread the lesson material referenced.

1. A soldier has been marching in a hot climate for several hours. He has not been drinking water even though he has been perspiring heavily. Suddenly, he yells in pain and grasps his leg. He is probably suffering from:
  - a. Heat cramps.
  - b. Heat exhaustion.
  - c. Heatstroke.
  - d. Dysentery.
  
2. A soldier is performing hard work in a hot climate. Suddenly, he stops work. You notice that he is perspiring heavily and looks pale. He tells you that he feels dizzy and may vomit. He is probably suffering from:
  - a. Heat cramps.
  - b. Heat exhaustion.
  - c. Heatstroke.
  - d. Indigestion.
  
3. Lack of perspiration is a sign of:
  - a. Heat cramps.
  - b. Heat exhaustion.
  - c. Heatstroke.

4. What is different in treating a heat injury casualty in a chemical environment and treating one in a nonchemical environment?
  - a. In a chemical environment, you do not loosen the casualty's clothing.
  - b. In a chemical environment, you do not have the casualty to lie down.
  - c. In a chemical environment, you do not elevate the casualty's legs.
  
5. Which of the following is a life-threatening condition requiring immediate treatment?
  - a. Heat cramps.
  - b. Heat exhaustion.
  - c. Heatstroke.
  
6. You are preparing to attack an enemy-held position. Should you drink extra water before the attack?
  - a. Yes, the water will help you keep physically strong and mentally sharp during the attack.
  - b. Yes, the water will act as a defense against chemical agent poisoning.
  - c. No, the water will make you sluggish.
  - d. No, the water will make you more likely to be overcome by chemical agents used against you.
  
7. You are working very hard in a hot environment. How much water should you drink?
  - a. Enough so that you are not thirsty.
  - b. Enough so that you remain slightly thirsty.
  - c. One canteen (one quart) every two hours.
  - d. One canteen (one quart) every hour.

8. When working in a hot environment, you should wear your uniform so that it is:
  - a. Tight-fitting.
  - b. Loose-fitting.
  
9. When you are working in hot weather, the loss of salt from the body can result in heat injuries. What is the best way of replacing the salt that your body loses due to hot weather?
  - a. Take one salt tablet for each hour that you work.
  - b. Eat table salt freely while you work.
  - c. Dissolve one packet of salt from your rations in your canteen and repeat each time you refill your canteen.
  - d. Eat three full meals each day.
  
10. Which of the following work procedures is/are correct when you are in a hot environment?
  - a. When your leader calls a rest break, continue to work if you are not too tired.
  - b. Avoid working in the shade.
  - c. Take your rest break in a shady area.
  - d. All of the above are correct work procedures.
  
11. A person suffering from heat injury should slowly drink at least \_\_\_\_\_ of cool water if possible.
  - a. One pint.
  - b. One quart.
  - c. One gallon.
  - d. One and one-half gallons.

12. Which of the following is/are proper procedures for treating heatstroke in a nonchemical environment?
- Move the casualty to a shaded area.
  - Elevate the casualty's legs.
  - Pour water on the casualty.
  - Evacuate the casualty.
  - All of the above.
13. A soldier has red, itchy areas on exposed flesh. The temperature is above freezing and the flesh has not been exposed to an excessively moist environment. The soldier is probably suffering from:
- Chilblain.
  - Frostbite.
  - Hypothermia.
  - Immersion syndrome.
  - Snow blindness.
14. A soldier is in a cold climate. His fingers on his left hand feel hot, itchy, and tender. The soldier should:
- Remove the glove from his left hand and put the hand inside his uniform under his armpit.
  - Remove the glove from his left hand and rub the hand in the snow.
  - Remove the glove from the affected hand and leave the hand exposed until the feeling of heat goes away.
  - Soak the affected hand in hot water.

15. A casualty has been standing in cold water with wet feet for several hours. The soldier says his feet feel as though they are on fire with pain shooting through his feet. Which of the following is NOT a proper treatment for this condition?
- a. Dry the feet thoroughly.
  - b. Remove wet socks and replace with dry socks.
  - c. Massage the foot until the pain stops.
  - d. Elevate the casualty's feet.
16. A pale, yellowish area on a soldier's cheek that feels solid to the touch is a sign of:
- a. Chilblain.
  - b. Frostbite.
  - c. Hypothermia.
  - d. Immersion syndrome.
  - e. Snow blindness.
17. Which of the following is a sign/symptom of superficial frostbite?
- a. A numb feeling in the affected area.
  - b. Severe muscle cramps in the affected area.
  - c. Blisters on the affected area.
  - d. Frozen (wooden) flesh.

18. A soldier with deep frostbite of the foot must walk through snow and freezing weather in order to reach a medical treatment facility. How should his foot be treated?
- a. The foot should be thawed; then the casualty should put on dry socks and boots and begin walking.
  - b. The foot should not be thawed until the casualty reaches the medical treatment facility.
  - c. The foot should be thawed, then packed in snow in order to refreeze the foot before he begins his walk.
19. A soldier has frostbitten toes. How can you rewarm them?
- a. Soak the casualty's bare foot in hot water.
  - b. Soak the foot in cool water to which ice or snow has been added.
  - c. Put the casualty's bare foot against your abdomen and cover the foot with clothing.
  - d. Put the casualty's foot as close as possible to a roaring fire.
  - e. All of the above are acceptable methods of treating frostbite.
20. A casualty has suffered frostbite and mild hypothermia. A soldier says, "Give him a warm whiskey and a cigarette; that will warm him up." Should you follow the soldier's advice?
- a. Yes.
  - b. No.

21. Pale and cold skin, lethargic behavior, shivering, and shallow breathing are signs of:
- a. Chilblain.
  - b. Frostbite.
  - c. Hypothermia.
  - d. Immersion syndrome.
  - e. Snow blindness.
22. Which of the following is a medical emergency caused by a drop in the casualty's core temperature?
- a. Dehydration.
  - b. Frostbite.
  - c. Hypothermia.
  - d. Immersion syndrome.
  - e. Snow blindness.
23. Treatment for hypothermia includes:
- a. Soaking the casualty in hot water.
  - b. Applying external heat such as body heat from a fellow soldier.
  - c. Rubbing snow on the casualty's limbs.



24. A soldier is walking on a snow-covered terrain. He begins to complain about sand in his eyes and his eyes are watering. He is probably suffering from:
- Chilblain.
  - Frostbite.
  - Hypothermia.
  - Immersion syndrome.
  - Snow blindness.
25. Which of the following is true concerning snow blindness?
- Snow blindness results in permanent blindness if not treated quickly.
  - Snow blindness can only occur if the temperature is below freezing.
  - The primary treatment for snow blindness is to protect the eyes from light.
26. Which of the following statements is true?
- Frostbite is a serious condition that can result in loss of life.
  - Frostbite usually begins in an area where there is a large supply of blood and large muscle groups.
  - Frostbite usually occurs when the air temperature is above freezing.
  - Once a person has had frostbite, he is less likely to have it again.
27. A soldier says, "Don't worry about cold injuries when the temperature is above freezing." Is he correct?
- Yes.
  - No, cold injuries can occur when the temperature is as high as 35°F.
  - No, cold injuries can occur when the temperature is as high as 40°F.
  - No, cold injuries can occur when the temperature is as high as 50°F.

28. A person who has previously suffered cold injuries needs to take \_\_\_\_\_ than normal precautions against cold.
- Greater.
  - Less.
29. In cold weather, you should:
- Reduce the amount of food you eat.
  - Exercise your muscles.
  - Reduce the amount of water you drink.
  - Increase your intake of alcoholic beverages.
30. When working in cold weather, you should:
- Wear your clothing as tight-fitting as possible.
  - Put on extra clothing when you are going to perform strenuous work.
  - Wear your clothing in loose layers.
31. Which of the following is a procedure to protect your feet in cold weather?
- Change your socks during rest breaks.
  - Do not wear overshoes.
  - Lace your boots tightly.
  - Wear five pairs of socks at one time.

32. One of your hands is becoming numb. What measure can you take to prevent serious cold injury?
- a. Remove your glove and soak your hand in gasoline or kerosene.
  - b. Remove your glove and rub your hand in the snow.
  - c. Remove your glove and put your hand under your shirt.
  - d. Keep your glove on and rub your hand in the snow.
33. Malaria is a disease that is transmitted by:
- a. Fleas.
  - b. Lice.
  - c. Mites.
  - d. Mosquitoes.
  - e. Ticks.
34. When you are in an insect-infested area, you should wash your uniform at least:
- a. Daily.
  - b. Weekly.
  - c. Twice a month.
  - d. Monthly.
35. Malaria pills provide:
- a. Complete protection against malaria.
  - b. Some protection against the worst effects of the disease, but does not guarantee full protection against the disease.

36. Malaria pills are usually taken:
- Immediately upon waking up.
  - Just before going to sleep.
  - At mealtime.
37. Always assume that water sources that have not been approved by military authority are \_\_\_\_\_.
38. You need to fill your canteen with water from a source in the field. You should use the \_\_\_\_\_, \_\_\_\_\_ water available.
39. A soldier says, "Ice can safely be bought from local civilian sources because the freezing kills the disease-causing bacteria." Is he right?
- Yes.
  - No.
40. You are a member of a small group of combat soldiers in a foreign country. Your team has exhausted its supply of water and the climate is very hot. There is a clear stream nearby, but you do not know if the water in the stream is safe to drink. One soldier says that he knows of a village a few miles away. What should your group do?
- Use the water in the stream as is.
  - Go to the village and use its water as is since it will be safe to drink.
  - Use the water from the stream, but disinfect the water before drinking it.
  - Do without water until you meet some other soldiers who have water that is safe to drink.

41. Before you purify water, you should check the color of your iodine tablets. Use only those tablets that are:
- a. Black.
  - b. White.
  - c. Orange.
  - d. Steel gray.
42. You have filled a two-quart canteen with water from a stream. How many iodine tablets should you put into the canteen?
- a. One.
  - b. Two.
  - c. Three.
  - d. Four.
  - e. Five.
43. You have added iodine tablets to a canteen of water. You should wait \_\_\_\_\_ minutes, shake the canteen, disinfect the threads, and wait \_\_\_\_\_ more minutes before drinking the water.
44. When you wash your hands, you should wash them with soap and water for at least:
- a. Fifteen seconds.
  - b. Thirty seconds.
  - c. One minute.
  - d. Two minutes.

45. If possible, you should bathe:
- a. Daily.
  - b. Twice a week.
  - c. Weekly.
  - d. Twice a month.
46. Which of the following listed actions is NOT an action done to prevent skin infections?
- a. Bathe frequently.
  - b. Wear loose fitting clothing.
  - c. Shave facial hair.
  - d. Use perfumed soaps.
47. When in the field, you should do which of the following?
- a. Wear brand new footwear to ensure durability during the field exercise.
  - b. Reduce congestion and swelling in your feet by doing lifting exercises.
  - c. Wear socks that are free of holes and/or knotty darns.
48. Is it possible to practice good oral hygiene in a field environment?
- a. Yes.
  - b. No.

49. In high steady-state noise level areas, which of the following actions should you take to protect against hearing loss?
- a. Limit time in hazardous noise areas.
  - b. Wear ear canal caps.
  - c. Wear specialized vehicle headgear.
  - d. All of the above.
50. If you use a towel that has just been used by a person with a respiratory disease, can the towel transmit the disease to you?
- a. Yes.
  - b. No, respiratory diseases are only transmitted by direct personal contact.
  - c. No, respiratory diseases are transmitted by insects.
51. You have a respiratory disease. Which of the following is NOT a proper measure to protect other soldiers from catching the disease?
- a. Avoid close contact with other soldiers.
  - b. Avoid going to sick call.
  - c. Avoid lending personal items to other soldiers.
  - d. Allow fresh air into your fighting position.
52. A male with HIV can spread the disease:
- a. Only to other males with whom he has sexual contact.
  - b. Only to females with whom he has sexual contact.
  - c. To both males and females with whom he has sexual contact.

53. The use of a condom can help prevent the spread of sexually transmitted diseases from:
- Males to females.
  - Females to males.
  - Males to males.
  - All of the above.
54. The use of a condom during sexual intercourse will help to protect a female from syphilis.
- The statement is true.
  - The statement is false.
55. Which of the following is a recommended action for disposing of food waste in the field?
- Place in a plastic bag and place it under a bush with the other soldiers' bags.
  - Locate an area 100 feet from the camp and spread the food waste on the ground so that the local animals will eat the food.
  - Bury the food waste to prevent flies from using the waste as a breeding area.
56. For a bivouac of 1-3 days, what method is recommended for human waste disposal?
- Cat-hole latrine.
  - Straddle trench latrine.
  - Deep pit latrine.



57. During a march, a \_\_\_\_\_ latrine can be used for disposing of human waste.
- Cat-hole.
  - Straddle trench.
  - Deep pit.
58. Which of the following is a correct statement about physical responses caused by tobacco use?
- The soldier can better endure colder climates when smoking.
  - The soldier has better night vision.
  - The soldier has decreased hand-eye coordination.
  - The soldier has decreased risk of pneumonia.
59. Washing your hands before eating is especially important in the prevention of:
- Insect-borne diseases.
  - Intestinal diseases.
  - Respiratory diseases.
  - Venereal diseases.
60. You are on a march carrying a 40-pound load and wearing body armor. Your unit is walking on hard ground at a speed of one mile every 16 minutes. The WBGT Index is 79. How much water should you be drinking per hour?
- 1/2 quart.
  - 3/4 quart.
  - 1 quart.
  - 1 1/2 quart.

## SOLUTIONS TO LESSON EXERCISES: LESSON 9

1. a (para 9-2a)
2. b (para 9-2b)
3. c (para 9-2c(1))
4. a (para 9-4a Warning)
5. c (para 9-2c)
6. a (para 9-3a(3))
7. d (table 9-1)
8. b (para 9-3d(1))
9. d (para 9-3c)
10. c (paras 9-3b(1), b(2), d(2))
11. b (paras 9-4a(3), b(5), c(6))
12. e (paras 9-4c(1), (3), (5), (7))
13. a (paras 9-6a, a(1), a(4))
14. a (paras 9-6a(4), 9-8a(1))
15. c (paras 9-6c(2), 9-8c(2))
16. b (paras 9-6d(2)(d), (e))
17. a (para 9-6d(1)(a))
18. b (para 9-8d Warnings)
19. c (para 9-8d(2)(c))
20. b (paras 9-8d Cautions, f(1)(c))
21. c (paras 9-6f(1), (2))

22. c (paras 9-6f, f Warning)
23. b (para 9-8f(2)(a))
24. e (paras 9-6e, e(1), (2))
25. c (para 9-8e)
26. a (para 9-6d(2))
27. d (paras 9-5, 9-6d, 9-7)
28. a (para 9-7)
29. b (para 9-7b)
30. c (para 9-7a(2))
31. a (para 9-7c)
32. c (para 9-8a(1))
33. d (para 9-9)
34. b (para 9-9f)
35. b (para 9-9d)
36. c (para 9-9d)
37. contaminated (para 9-10a)
38. cleanest, clearest (para 9-10a(1))
39. b (para 9-10b)
40. c (para 9-10a)
41. d (para 9-10a(2))
42. d (para 9-10a(3))
43. five, thirty (paras 9-10a(5), (8))

- 44. b (para 9-10c)
- 45. a (para 9-13a)
- 46. d (para 9-13)
- 47. c (para 9-14a(2))
- 48. a (para 9-15)
- 49. d (paras 9-12a, b, d)
- 50. a (paras 9-16, 9-16a)
- 51. b (para 9-16b)
- 52. c (paras 9-17, 9-18a)
- 53. d (para 9-17, 9-17a)
- 54. a (para 9-17, 9-17a)
- 55. c (para 9-11a(3))
- 56. b (para 9-11b(1))
- 57. a (para 9-11b(2))
- 58. c (para 9-19b(4))
- 59. b (paras 9-10, 9-10c)
- 60 c Tables 9-1 and 9-2.  $WBGT = 79 + 5 \text{ (body armor)} = 84$   
 $Work = 60/16=3.75 \text{ mph} = \text{Hard}$



**APPENDIX**  
**IMPROVED FIRST AID KIT**



- A Emergency Bandage (1)
- B 4-inch Kerlix™ Bandage (1)
- C Nasopharyngeal Airway (1)
- D 2-inch Tape (1)
- E Exam Gloves (2 Pairs)
- F MOLLE™ Pouch (container for other items)
- G 14g Needle (1)
- H Combat Application Tourniquet (1)

Total Weight: 1.08 pounds

Size: 128 cubic inches

**NOTE:** The actual items in your kit may differ somewhat from the example shown above..

